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THE WEST AMERICAN SCIENTIST.

C. R. ORCUTT, EDITOR AND PUBLISHER.

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VOL. II. SAN DIEGO, CALIF., FEBRUARY, 1886. No. 13.

PROFESSOR GEORGE DAVIDSON.

[From the "Pacific Rural Press."]

Probably no name is better known in the scientific world of the Pacific Coast than that of Professor George Davidson, of the U. S. Coast and Geodetic Survey, who was recently re-elected for the fifteenth time president of the California Academy of Sciences. His active and untiring efforts, extending over a long period of time in advancing the interests of science on this coast, are well known; and the work he he has accomplished in the service in which he holds high rank has earned for him a name and reputation which might be envied by any man. A brief sketch of his life and services will be of interest to very many.

George Davidson is at the head of the Field Assistants of the U. S. Coast and Geodetic Survey. He was 60 years of age in May last, and has been on the Survey over 40 years on consecutive duty, serving from Newfoundland to Texas and from Panama to Alaska.

He came to the Pacific Coast early in 1850, when it was a new and difficult field, having been chosen for this special duty by Superintendent Bache. He served five consecutive years, winter and summer, on the Atlantic and Gulf Coasts before that, and afterward during the rebellion, and has been again upon the Pacific Coast since 1867.

Professor Davidson has made himself thoroughly familiar with the currents on the Pacific Coast and discovered the existence of inshore eddy currents which affects all bars and influences all improvements for harbors of refuge. He has given great attention to all hydraulic problems, to the water supply of large cities of Europe and America, and the drainage of great districts (Egypt, Italy, Holland, etc.). Most of these studies were directly connected with the work of the Coast and Geodetic Survey.

Beyond these he has been an active member of the California Academy of Sciences and president since 1871, and has published original investigations in geometry, in the devising of new instruments of precision, in the physical appearance of Saturn, Jupiter and Mars; on the constitution or the tails of comets, the plateau of the Pacific off the California, etc. He has produced papers upon methods of determining the solar parallax, the introduction of science in our public schools, the endow-

ment of scientific research by the State, the necessity for a physical survey of this State, etc. To the Geographical Society of the Pacific he has presented papers upon the ascent of the Makushin volcano, the eruptions of Bogoslov and other volcanoes, on the shoaling of the bar of San Francisco bay, the dangers of future shoaling, etc.

After Prof. Peirce's appointment as superintendent of the coast survey, in 1867, Prof. Davidson was placed in charge of the work on the Pacific Coast, and laid out all the schemes of work for all parties from 1859 to 1875, and inspected all the fields of work. An appeal to the records will show greater general progress and more system in that period than at any other. He made telegraphic connections for longitude with all the different centers of triangulation and topography, and in the telegraphic longitude work between San Francisco and Cambridge, determined directly the signal time over 7,200 miles of line. He determined the eastern boundary, 120th meridian, of California, in 1873.

In 1881 he measured the longest base-line yet attempted in trigonometrical operations, and with the greatest accuracy. In acknowledgment of the character of the system of triangulation developed from the Yolo base-line to the Sierra Nevada and the Coast range, and the high standard of the observations, the superintendent has designated it by the name of "Davidson Quadrilaterals."

Professor Davidson holds the position of Honorary Professor of Geodesy and Astronomy in the University of California (1873), made at the suggestion of Prof. Peirce, and was a regent of the same institution from 1877 to 1884. At his own expense he has maintained the first astronomical observatory on the Pacific Coast of North America, and has given the use of his equatorial to the survey when special observations demanded it.

In 1873 he was appointed by the President of the United States one of the three U. S. Commissioners of Irrigation of California, with General B. S. Alexander and Colonel G. H. Mendell. The report made by these Commissioners was published by the Government. Professor Davidson afterwards went officially through India, Egypt, Italy, etc., to study the same subject, and to examine and report upon harbors of refuge, etc.

Aside from his scientific attainments in special branches, the subject of this sketch is an exceptionally well-informed man on general topics. Traveled and well read, there are few subjects which have escaped his attention. His social qualities are such as to have endeared him to a large circle of friends, and his convesational powers of a character to make him one of the most agreeable of companions. Few men are so frequently consulted for advice or information. It is one of his peculiarities that he takes the greatest interest in young men, and is always ready to assist them in any possible way, a fact to which many he has helped can testify. Having grown sons of his own, he appreciates the thoughts and feelings of young men better than most men in his position are apt to do.

Librarians and the secretaries of scientific societies are invited to exchange their publications for this journal, as well as other publishers and authors of scientific works.

BOTANICAL NOTES.

Among the later publications received, are the supplements and indexes to the Synoptical flora of North America, by Dr. Asa Gray. From the supplements we gather the following notes which will be of interest to our botanical readers, especially those who may have received portions of the editor's distributions of herbarium specimens.

Pentachæta paleacea, Greene, founded on a few fragmentary specimens, is referred to P. aurea, Nutt.

Franseria chenopodifolia, Benth., found abundantly in the Tijuana valley, north of the U. S. boundary, and south to Magdalena bay, is given in my check-list as F. deltoidea, but was distributed under its true name.

Nemacladus tenuissimus and N. cappillaris, Greene, are given as synonyms of N. ramosissinus, Nutt., while N. pinnatifidus, Greene, is reduced to a varietal rank, as are also N. montanus and N. rubescens, Greene, both of the last under the one name, var. montanus.

Arctostaphylos arguta? var. diversifolia, Parry, is raised to specific rank as A. diversifolia, Parry.

Collomia, and certain bractless species of Loeselia are incorporated into Gilia: thus Loeselia tenuifolia, L. Matthewsii and L. guttata become gilias, along with Loeselia effusa—now Gilia Dunnii, Kellogg.

Eucrypta is referred back to Ellisia, and Eucrypta paniculata, Nutt, (vide Greene) is described as Ellisia Torreyi. var. Orcuttii, n. var.

Phacelia suffrutescens, Parry, is considered as of varietal rank only, and a new species closely related to P. Orcuttiana and P. Fremontii, is described, which was collected on the mountains of Lower California and has been sparingly distributed under the herbarium number, 1087.

The Eriodictyons are briefly treated, three species only being recognized; E. angustifolium (with var. pubens) being connected with E. glutinosum. The other two species are E. sessilifolium, Greene, (distributed under the manuscript name E. intermedium, Parry, and also as a variety of E. angustifolium), and E. tomentosum, Benth.

A revision of Mimulus is given, in which Dr. Gray prefers an arrangement of the genus under five subgenera to a division into various genera. He recognizes only two species under the section Diplacus, M. glutinosus and M. puniceus, and his arrangement differs in various other respects from that of Mr. Greene. M. inodorus, Greene, is made M. moschatus var. sessilifolius; Greene's M. guttatus is referred back to M. luteus; M. androsaceus, Curran, is made a var. of Palmeri; and the re-establishment of the older name, M. exilis, Durand, in place of M. pilosus, Watson, are some of the changes.

The plant hitherto referred to Aphyllon Ludovicianum, Gray, is referred to A. Cooperi, Gray.

Trichostem a Parishii, Vasey, is reduced to a variety of T. lanatum.

Monardella nana and M. tenuiflora are both given as varieties of M. macrantha. The plant distributed from the mountains of San Diego county as M. nana belongs to M. hypoleuca, Gray.

EDITOR'S NOTES.

The printer omitted the note from the January number of the SCIENTIST, saying that no December (1885) number appeared. The January number was in type in December, but the printer was delayed in printing, so that it was not issued til February 22d.

S. E. Cassino has retired from the firm of S. E. Cassino & Co., of Boston (who advertise in this paper), Bradlee Whilden continuing the business for the present under the same firm name.

California Erythraeæ are wanted by the editor, who requires about fifty fine herbarium specimens of nearly every species.

We would acknowledge the receipt of valuable publications from the following authors: Geo. F. Kunz, Dr. C. C. Parry, Dr. Asa Gray, Prof. C. S. Sargent, Abbott Kinney and Rev. E. L. Greene, which should receive further notice if time and space permitted.

The pavement-like teeth of a sting ray, from Todos Santos bay, Lower California, forms the material upon which Miss Rosa Smith bases a new species, Rhinoptera encenadae, lately described in the proceedings of the U. S. national museum.

Nearly one-fourth of those who had been duly elected to active membership in the San Diego society of natural history, had failed to sign the constitution as required to do. The affairs of the society have been conducted very loosely in the past and we see slight hope for an improvement in the future. It is hoped that some distinguished scientist will visit San Diego soon, when we shall have the pleasure of recording the 'proceedings' of another meeting.

'We have made a mistake in encouraging additions of persons who are not interested in natural history, as members,' writes the secretary of one of the prominent scientific societies on the coast, very truly giving that as the cause of their ill success in one of the most educated sections of the state. The secretary of another society writes: 'It is easy to awaken an enthusiasm, but hard to keep it up; our society is now inactive.'

The secretary of the young Humboldt society of natural history has published a letter giving some valuable information of interest to the members of that association. The membership is largely composed of teachers, who should interest their scholars in the personal observation of the objects of Nature. We would advise them (and all other teachers as well) to organize chapters of that grand institution for young people, the Agassiz association, the surest way of enlisting and *retaining* the attention of their pupils, as well as of preserving their own interest in the pursuit of knowledge.

What is an editor to do, when, after the second proof-reading, the printer makes some 'pie' and changes a 'collector' into a 'doctor'? *E pluribus unum.*

We ask correspondents to send in more notes and short articles, selected or original, which they would like to see in print or have in a permanent form that would be suitable for this paper.

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SAN FRANCISCO MICROSCOPICAL SOCIETY.

January 13, 1886. Dr. C. P. Bates, 'Culture methods used in the study of micro-organi ms.'

January 27. Dr. Ferrer, 'The advantages claimed by Koch's gelatine method.'

February 10. Dr. Mouser, 'Annual address.' The annual reports of the secretary and tre ur r were received. The officers for the coming year were elected as follows: S. M. Mouser, president; E. J. Wickson, vice-president; A. M. Hickox, treas.; Chas. W. Banks, corresponding sec'y; A. H. Breckenfeld, recording sec'y.

February 24. F. L. Howard, 'On Teredo navalis and Limnoria terebrans.'

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From San Diego and vicinity: Acmaea asmi, patina, persona, scabra, spectrum, astyris carinata, barbatia gradata, barleeia stbtenuis, haminea virescens, cerithidea sacrata, bythinella intermedia and binneyi, conus californicus, coecum orcutti. lasea rubra, fissurella volcano, bittium tuberculatum, donax californicus, heterodonax bimaculatus, litorina scutulata and planaxis, lottia gigantea. oystrea lurida, haliotis cracherodii and splendens (small), septifer bifurcatus, succinea oregonensis, myurella simplex, nuttalliana scabra, nassa tegula, omphalius fuscescens, phasianella compta.

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Vol. II. MARCH, 1886. *No. 14.*

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VOL. II. SAN DIEGO, CALIF., MARCH, 1886. NO. 14.

GUADALUPE ISLAND, LOWER CALIFORNIA.

Ten years ago ' This sweet lone isle amid the sea '—I am not responsible for the application of this line—was first visited by a naturalist, in the person of Dr. Edward Palmer, well known from the important botanical collections he has made in Northern Mexico and in the southern territories of the United States. There is something like a charm attaching to the animal and vegetable life of the remote islands of the great oceans, for most of them support plants and birds and other organisms peculiar to themselves, often, however, associated with plants, at least, of almost world-wide littoral distribution; but the presence of the latter element is due to situation and the nature of the shores, concerning which I have something more to say later on. Guadalupe Island is about the size of the Isle of Wight, and is in 29° north latitude, about 100 miles from the western coast of Lower California, lying in the course of the great ocean current which flows southward from Alaska. It consists of a large tableland about 3000 feet high, its volcanic rocky side being in most places too precipitous for even a goat to climb, and almost wholly barren. The plateau is interrupted by a central ridge, some points of which rise 1000 feet higher; but the tableland portion of the island is pleasant, with a considerable breadth of open grassy plain, some miles of Cypress woods, and several springs of excellent water; although there are no streams that flow after the winter rains have ceased.

The climate of Guadalupe is described as colder than that of the coast regions of even the central part of California, a circumstance due to its position in the direct path of winds and currents that sweep down from the arctic regions. Fogs are heavy and prevalent, especially in the higher parts of the island; yet the south is sunny and excessively hot and dry in the summer, so much so that all vegetation is in some seasons completely scorched up. As already mentioned, it is colder than the opposite coast, especially in the northern exposures; ice an inch in thickness has been observed in the middle of the island, and snow to the depth of 2 inches, followed by several days of cold rain. Yet in the northern extremity it keeps clear and warm, and it is warm in the lower canyons or ravines.

Dr. Palmer collected 110 species of flowering plants, which are communicated by Mr. Sereno Watson in the eleventh volume of the *Proceedings of the American Academy of Arts and Sciences.* Omitting a species of Heuchera, the specimen of which

was insufficient for determination, Watson classifies them in five groups, namely:—1, introduced species, twelve; 2, species ranging from the Atlantic to the Pacific States of North America, nine; 3, species found throughout California, or at least as far north as San Francisco, forty-nine; 4, species found in Southern California, below Los Angeles, or in Arizona, eighteen; and, 5, species peculiar to the island, twenty-one.

Last spring Mr. E. L. Greene visited the island, and he publishes the particulars of his week's sojourn there, together with the botanical results, in the BULLETIN of the California Academy of Sciences, from which it appears that he collected fourteen species that were not in Dr. Palmer's collection. Of these seven are Californian, some of them having a wider distribution; four are common European weeds, and two are described as new species; whilst one, a seedling Arctostaphylos, is indeterminable.

Guadalupe has never been inhabited, according to Greene, except very temporarily, by shipwrecked or seal-hunting sailors, or fugitives from Mexico. But since the beginning of 1884 a small band of some forty Lower Californian soldiers has been stationed there by the Mexican Government, 'to prevent the wholesale slaughter of the goats, of which there are many thousands still on the island, notwithstanding the fact that for some two or three years prior to 1884 many a cargo of goat skins and tallow had been taken to San Diego.'

In this, as in so many other remote islands, goats were originally introduced for the purpose of supplying food to shipwrecked or passing mariners; and the effect in many instances has been the almost complete extirpation of the indigenious vegetation. How long ago goats were first introduced into Guadalupe is uncertain, though probably towards the end of the last century. Dr. Palmer mentions them among the agents affecting the vegetation, yet without any specific account of their having proved destructive. Greene, however, specially alludes to the favorable effect on the vegetation 'in the very best part of the island' the small garrison has had, as the goats, in consequence of being constantly hunted, avoid the part where the soldiers encamp.

From the figures given above, and the relationships of the endemic species, it is evident that the flora of Guadalupe Island is essentially Californian, as distinguished from the Mexican flora, to which belongs the vegetation of the intervening peninsula of Lower California. Respecting the plants which by their abundance or prominence gave character to vegetation, Palmer says:—"The 'Sage brush' and 'grease-woods' of the Basin [the 'Great Basin' of California] are represented by an Artemisia and an Atriplex, which share with a Franseria in covering large tracts, and in protecting the soil and the smaller animals from the winds and sun. Trees are numerous over much of the island, chiefly coniferous: a pine, a juniper, and a cypress, and a small oak. To these is to be added the palm, which is frequent in the southern canyons, growing to a height of 40 feet." Among introduced plants Erodium cicutarium was more abundant than any other plant in the island, being found everywhere. The herbaceous and shrubby endemic plants belong to genera represented in California, or exclusively Californian and eastward of it, and the species are more closely allied to those of the Californian region. The pine is a

two-leaved variety of Pinus insignis; the cypress, Watson describes as a new species (Cupressus guadalupensis), but it is very closely allied to the beautiful Californian C. macrocarpa; and the juniper is referred to Juniperus californica. The oak (Quercus tomentilla, Engelmann) is endemic, and allied to the common Californian Q. chrysolepis; and the endemic palm (Erythræa edulis) is represented on the mainland by a second species discovered in the Cantillas canyon, Lower California.

It is interesting to compare Mr. Greene's observations on the various elements of the vegetation ten years later than Dr. Palmer, especially in relation to the very rapid disappearance of some of the endemic species and other formerly prominent indigenous ones. Palmer found the cypress in irregular groups in the middle of the island, apparently common enough; now it is already becoming rarer, and Greene says he cannot guess at the cause of its destruction. It would seem, however, that the existing trees have mostly reached the limit of their age, and the species is disappearing because the numerous goats prevent seedlings from growing up and replacing the older generations. Formerly, Greene supposes, it must have occupied almost the entire plateau of the northern half of the island; but now upon the greater part of this tract only the fallen decaying trunks remain. It is a pity so noble a tree should die out. It has the conical-shaped head of C. macrocarpa, as it grows in this country, not as it grows in its home, where its habit is cedar-like, and reaches a height of 50 feet, with a trunk sometimes as much as 25 feet in circumference.

The Juniper in Palmer's time was all over the middle of the island and occasional at the south end, in the ravines and valleys, forming groves about 15 feet high. Now, we are informed, it is on the verge of extinction—'in the middle of the island only three trees that were not quite dead; and on these three only a few tufts of green twigs gave the feeble sign of exhausted vitality. Only on a south-eastern cliff, hanging over the sea, did I find a tree vigorous enough to be bearing some well-formed fruit.'

The pine still exists in groves of considerable extent on the high narrow ridge forming the north-eastern extremity of the island; but the handsome oak, a spreading tree 50 feet high, has dwindled down to about half-a-dozen individuals; whereas Palmer states that it was frequent at the north end and occasional in the canyons on both sides of the island. Concerning the palm Greene is silent. On the ascent from the narrow beach to the plateau the most conspicuous plants at the time of his visit were Senecio Palmeri, a handsome shrub, 3 or 4 feet high, Sphæralcea sulphurea, Hosackia ornithopus, and Convolvulus macrostegius, all endemic species, associated with the Californian Brodiæa capitata, which was also exceedingly common on the tableland itself.

The very widely spread littoral element alluded to at the beginning of this sketch is wanting on the shores of Guadalupe; whether this is wholly due to the nature of the coast, or partly due to the direction from which the oceanic currents come that touch the island, is not clear from the information available. In the *Botany of the "Challenger" Expedition* I have brought together all the trustworthy evidence I could find bearing upon the dispersal of seeds and plants by oceanic currents, &c., and I have there pointed out that many of the plants thus conveyed are not exclu-

sively littoral, but actually grow and thrive equally well inland. More evidence is wanted on this subject, and that is my reason for mentioning it here; but there can be no doubt that the sea has played a most important part in covering the distant coral islands of the Pacific and Indian Oceans with vegetation, thereby rendering them inhabitable.

In conclusiou, I may, perhaps, be permitted to repeat a curious fact concerning the Cocoa-nut, recorded in Mr. O. H. Forbes' book on the Malayan Islands. It is very well known how widely the Cocoa-nut Palm is dispersed on tropical sea-shores, both insular and continental; and the question has often been discussed how far oceanic currents have been instrumental in effecting this wide distribution. Some writers maintain that it is mainly, if not entirely, due to human agency; and one argument employed against oceanic agency was that the Cocoa-nut would not germinate unless buried. This is very likely correct, as to bare ground, at all events; but, as I have stated elsewhere, the waves often bury the objects they cast ashore; and Mr. Forbes observed that the burrowing crabs, so numerous in the Keeling and other islands, sometimes perform the operation when burrowing very near the surface.—*W. Botting Hensley, in the 'Gardners' Chronicle,' Nov. 14, 1885.*

CORRESPONDENCE.

On Palms.—I have a small plant of Erythea edulis growing and it promises to be hardy here, as during the unprecedented cold weather of January, the like of which has not been experienced by the oldest residents, only the blades were browned and the petioles remained uninjured. I understand also that severe cold and ice is sometimes seen at Guadalupe Island, its native place. Erythea armata looks to me like Brahea glauca which I have tried here repeatedly without success, as our soil or climate does not seem favorable to it. * * * * *

During our late freeze when mercury fell 20° and scarcely rose above freezing point at noon for several days, Washingtonia filifera was scarcely affected, but W. robusta was browned in the blade and the interior structure of the petioles suffered more or less, proving the greater susceptibility of the latter to extreme temperature, and indicating a more tropical habitat. The points of the segments are quite deeply bifid in W. filifera and slit down but little in W. robusta. None of my specimens of robusta were destroyed however and all are coming on well. I may add that large specimens of Latania borbonica come out with no other injury beyond the browning of the blades, but Corypha australis suffered more. Phenix dactylifera lost their leaves but the buds are still alive and growing. Sabal palmetto and the different varieties of Chamaerops were not affected in the slightest degree.

In the January number of the 'Rural Californian' it mentions that G. D. Compton had returned from a trip through San Gorgonia pass, and visited the palm trees on the east side of the mountain. They are supposed to be a different species from W. filifera and it is stated that the Indians live upon the fruit a part of the year.

I once had a small specimen of a new species of Chamaerops from Lower California grown by a northern nurseryman, which exactly resembled C. excelsa. Unfortu-

nately it was eaten into and destroyed by a burrowing rodent. Hope that in time you will be able to clear up the uncertainty that exists in our knowledge of the Californian palms. Yours truly, E. H. H.

Federal Point, Fla., Feb. 25th, 1886.

[We take the liberty of publishing the above extracts from a very interesting private letter. The reference to several Californian palms that are very imperfectly known is suggestive of the work that should be done. Brahea glauca is generally known as a seedsmen's name for Erythea armata.—Ed.]

'Hag-Fish' Wanted.—I am very anxious to obtain some specimens of Myxine, commonly known as the 'Hag-fish,' which I understand is quite common on the California coast. I wish them preserved in a special manner according to the accompanying directions.

Hoping that you will be successful in obtaining the animals, I remain most truly yours, Benj. Sharp.

Acad. Nat. Sci., Phila., Feb. 7.

[Any one who can obtain specimens of the hag-fish, which has never been reported from San Diego, but is common further north, would confer a double favor by addressing the editor for directions, or by writing directly to Prof. Sharp.—Ed.]

SAN DIEGO SOCIETY OF NATURAL HISTORY.

March 5, 1886.—Present, 7 members and 5 visitors. Reports of Commitees:—Rosa Smith, on seal, reporting that a seal had been ordered for the society. Donations:—W. W. Stewart, skull and vertebræ of Dolphinus bairdii—Bairds' dolphin; John D. Hoff, photograph of ancient pottery of Arizona and New Mexico. Publications received:—Journal of the Trenton natural history society; Random notes on natural history; Tenth census of the U. S,, vol. xiii, 1883; On the fauna of the lower devonian of the Ural mountains. Communications:—Rosa Smith, on a new species of sting ray, from Todos Santos bay, Lower California; also on phosphorescense observed on damp earth, the origin of which was unknown. Elections:—Frank E. Blaisdell, and A. Barnett, as active members.

EDITOR'S NOTES.

On time again! This number issued by the 15th.

The San Diego society of natural history is planning a course of lectures in behalf of its building fund.

San Diego was favored with a hail-storm on the morning of the 3d.

The rate for advertisements in this journal will hereafter be $10.00 per page for single insertion. Twenty per cent. discount will be allowed on continued advertisements and twenty per cent. additional for any fixed position. No objectionable advertisements will be inserted. Tenths of a page in proportion.

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From San Diego and vicinity: Acmaea asmi, patina, persona, scabra, spectrum, astyris carinata, barbatia gradata, barleeia stbtenuis, haminea virescens, cerithidea sacrata, bythinella intermedia and binneyi, conus californicus, coecum orcutti, lasea oubra, fissurella volcano, bittium tuberculatum, donax californicus, heterodonax bimaculatus, litorina scutulata and planaxis, lottia gigantea, oystrea lurida, haliotis cracherodii and splendens (small), septifer bifurcatus, succinea oregonensis, myurella simplex, nuttalliana scabra, nassa tegula, omphalius fuscescens, phasianella compta.

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San Diego County is situate in the southern extremity of California—the Pacific ocean on the west, and the grand Colorado river on the east. The Coast Range divides the County into two grand divisions. The eastern side has some good land, but is noted chiefly for its valuable mines and minerals. The western side slopes toward the ocean, is interspersed with plains, valleys and table lands, running streams, timber and productive soils. It is well adapted to the diversified pursuits of agriculture, horticulture and grazing. It is this part of the County which is now being rapidly improved. The area of the County is equal to that of Massachusetts, Connecticut and Rhode Island combined—being 14,969 square miles. Population of the County in 1880 was 8518; in 1884 it had increased to 13,000. Assessed valuation in 1880 was $3,525,253; in 1884, $8,140,000.

One of the most important topographical features of the County is the Bay of San Diego—a beautiful sheet of water more than 15 miles long, being the only land-locked harbor south of the Bay of San Francisco within American territory. The country embraced within the boundary lines of the County presents a constant succession of mountains, valleys and table lands, giving a wide range of adaptation to industrial pursuits and the climatic conditions suited to almost any possible need or preference.

Two transcontinental railways traverse the County—the Atlantic & Pacific and the Southern Pacific. Along the lines of these roads, and in other parts of the interior of the County, are many thrifty towns and settlements, which cannot here be described or mentioned, but just such localities as many would like for health, profit and a pleasant home.

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VOL. II. SAN DIEGO, CALIF., APRIL, 1886. No. 15.

MOLLUSKS OF SAN DIEGO.—II.

[*Continued from page 4.*]

Cerostoma nuttalli, Conrad, is distinguished from the preceding shell by the absence of the wing-like varices. It is abundant on the rocky beaches, some of the pure white or banded varieties being quite pretty.

Muricidea barbarensis, of Gabb, is quite rare. One large and old specimen has been found at Pt. Loma, inhabited by a hermit crab, which was seven-eighths of an inch long. Muricidea incisa, Brod., is easily distinguished by the dark brown or black bands which are very prominent in the beach worm specimens that are occasionally washed ashore. This species is some times found living near low-water mark.

Pteronotus festivus, Hinds, found abundant among small, angular boulders in sheltered places, is distinguishable from Murex trialatus by the characteristic recurving of the wing-like expansions of the shell. In some old specimens these are worn off when it is more difficult to identify and might be mistaken for Cerostoma nuttallii but for its slenderer appearance.

The Ocinebras are mainly small, stout shells. A single specimen only of Ocinebra subangulata, of Stearns, is known from San Diego, a beautifully colored individual of this species having been found on kelp in 1883, which is now in the museum of the Philadelphia Academy of Science. Nuttall's Ocinebra poulsonii is somewhat larger and of duller colors, being dingy white marked by revolving black lines. The shell grows to a length of nearly two inches, and is found abundantly with pteronotus.

Ocinebra circumtexta, Stearns, of which only a few young specimens have been collected at San Diego, approaches the purpuras in general appearance. The shells referred to in Proceedings U. S. Nat. Mus., VIII, 535, under the name 'interlirata,' belong to this.

Ocinebra interfossa, and gracillima, are small shells and abundant under stones partially imbedded in shell sand. O. interfossa is distinguished by a coarse net-like sculpturing, and is smaller and less abundant than gracillima.

One of the most common shells on this coast is Purpura saxicola, the 'rock purple,' which derives its generic name from the fact that the ancient Tyrians obtained a purple dye from the bodies of a similar species. It is less than an inch long, and possesses a short spire, flattened columella, thin outer lips, short canal and

a small umbilicus. The inside is reddish brown, while the outside varies much in both form and color. It is not known on our San Diego beaches, but is found abundant on rocks near high water mark just south of the U. S. boundary, and is common northward.

Purpura biserialis, Blainv., is an extra-limital species of which a single large and fine living specimen was found on the ocean beach near La Hoya, making San Diego the most northern locality known for this tropical shell.

Monoceros lugubre, Sby., is a stout representative of a genus peculiar to the Pacific coast which is found abundant on the rocky beaches south of the U. S., but rarely found at San Diego. The shell is about an inch long, of a rich chocolate color (rarely light yellow or white) and is broader and larger than our other species. The genus receives its generic name from a little horn near the base of the outer lip, on account of which it is sometimes called the horn shell.

M. engonatum, Conr., is a more elongated and smaller shell with a white mouth. The outside is marked with spiral grooves, which with the lines of growth break up the outer covering or epidermis into little brown blocks with "streets" of olivaceous green between. Blainville's var. spiratum is larger, more angular and less regularly marked off into blocks. M. pauciliratum, Stearns, on the other hand is more regularly marked off into squares, is less elongated and smaller. All these shells are very thick and strong, as is usual with shore shells where there is danger of being dashed against the rocks. They all also possess about seven teeth on the outer lip.

Chorus belcheri, Hinds, formerly abundant at San Diego (during the early whale fisheries), forms the last representative of the murex family found on our coast. It is a huge shell, four to six inches long, light brown color, with a long canal, and easily distinguished by its tapering spire, bristling with a crown of long, sharp points. Now rare at San Diego but common further south; large numbers of the dead shells of this and the following species, with Siphonalia kellettii, being washed ashore frequently on Todos Santos bay Lower California.

The second family in the class under consideration is the Triton family, of which Ranella Californica is our only shell which can claim to be a member. The frog shell (as it is sometimes called) is a solid, light-colored shell with two heavy folds on opposite sides, large canal and spire of about four whorls. Edge of the aperture crenulated. Length, three to six inches. Not rare; preys on sand urchins (Echinarachnius), renillas and other marine animals, bullas, etc.

[To be continued.]

In the *Gurrah* mode of watering plants in India, a common water-pot styled *codum* is used. The pot has a small mouth and a small hole is knocked into the bottom and the pot is then buried to a depth of one-third its size as near the stem of the plant as possible, and kept constantly filled with water which very gradually oozes into the soil through the minute opening at the bottom without causing waste by spilling or evaporation. The method is used with great success.

The Indian farmers on Pyramid Lake, Nevada, thresh their wheat by hand and winnow it in baskets just as the Egyptians did three thousand years ago.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

The current issues of the principal scientific periodicals were added to the files, and William Norris donated a pamphlet, by Warren and Chase, descriptive of over twenty new and rare diatoms, and containing photographic illustrations of the same.

Honorary membership was conferred upon Dr. Henry Ferrer of this city. Dr. F. Riehl of Alameda was elected a resident member.

The committee having in charge the preparation of a revised edition of the Society's constitution was instructed to proceed with the printing thereof.

A slide of Spirogyra crassa, in fruit, was handed in by Mr. Breckenfeld, who stated that Dr. Cooke, in his recently-published work on Fresh-water Algae, gave .16 mm. as the largest recorded diameter of the filaments of this interesting species—the largest of its genus. But in the slide under consideration, careful measurements showed the average diameter of the filaments to be 1-150 of an inch (equal to .17 mm.), while in many cases the diameter exceeded .18 mm. The California variety was therefore the largest in the world, owing probably to 'our glorious climate.' The plant was found growing in a ditch near Napa.

Under a Spencer dry, ⅛-inch objective, of 115° angle, were shown specimens of the exquisite diatom, Cestodiscus superbus, and also the striae, or marking on the valves of No. 18, on Moller's 'Probe-Platte' of diatoms, mounted in phosphorus. The latter diatom was also shown.

The 'Improved Beck Microscope Lamp,' just received by Dr. Selfridge, was exhibited by him to the members present.

A number of objects were splendidly shown by Dr. Stallard.

A. H. Breckenfeld, Rec. Sec'y.

A new theory of the formation of coal has been propounded by Mons. L. Breton, who considers it to have been produced by the sinking of floating islands like those which now occur on many lakes and rivers, and which are especially noticeable on the Upper Nile. The turf of which these islands are chiefly composed becomes fossilized at the bottom of the water.

The common perfumes used in confectionery and cordials have been investigated by two French chemists. Large quantities of these chemicals proved poisonous to animals, but it is doubtful whether the quantities actually employed by the confectioners or liquor manufacturers are considerable enough to do harm.

Not a single instance of color-blindness has been found by Schwarzbach in an examination of 2000 Hottentots, Malays, Melanesians, Australians, Maoris and Polynesians; and he concludes that the defect is confined to the white race, and is due to influences connected with civilized life.

The beautiful red plumage of a South African species of birds has been chemically examined and found to be due to copper. When the birds are kept from food containing copper they entirely lose the tint produced by that mineral.

EDITOR'S NOTES.

Subscribers will be notified when their subscriptions to this journal expire.

A leather cannon was proved in Edinburg in 1778, fired three times and pronounced good.

The article on the mollusks of San Diego was crowded out of the February and March numbers.

This number is printed before the usual time, so that we have nothing to report of societies for April.

The subject of cremation is being agitated by some of the members of the San Diego Society of Natural History.

We acknowledge a very interesting paper received from Elward Morren on the 'Sensibility and Motion of Plants.'

The competition of prison labor with free labor has been widely discussed of late, but the competition is not thought to have any material effect on free labor.

Paper barometers can be made by soaking paper in a solution of chloride of cobalt. It becomes hygroscopic, and if exposed to the air will change from blue to pink.

We regret to record the death of the distinguished scientist, Charles Jacques Edward Morren, at Liege, Belgium, the 28th of February, 1886. He was born December 2d, 1833.

James Britten shows in the February 'Journal of Botany' that the genus Brodiaea of Smith should bear an older name, Hookera of Salisbury. Our species may retain their specific names.

Among the permanent departments which we hope to establish in this journal are botany and horticulture, vertebrates, lower invertebrates, entomology, psychology, correspondence, exchanges, literature, etc.

A botanical trip of several months' duration is being planned which may prevent issuing another number of the SCIENTIST till June or later, but subscribers will not be the losers—rather the gainers, as some valuable information will probably be secured for publication.

Subscribe! Books, natural history specimens or stamps are acceptable. All are invited to contribute. It was intended ere this to have enlarged the size of this journal very materialy, but delays and other difficulties have arisen which render it impracticable to do so before the end of summer. We shall endeavor to give all subscribers the value of their money.

The peninsula in front of San Diego city is being improved by a company who propose making it a popular resort and to which the name Coronado Beach has been applied. In boring for artesian water, a strata of sand was found containing numerous fossil shells of the later tertiaries. The more prevalent species were Phasianella compta, Ostrea lurida and Anomia lampe in the order named. The strata was found at a depth of nearly seventy feet.

LEUCITE FROM LOWER CALIFORNIA.

The history of leucite is very interesting. Some thirty years ago Humboldt made the general statement that leucite occurred nowhere outside of Europe. Curiously enough, until within a few years this statement held good. In 1874, however, Vogelsang found it in an Asiatic basalt, and in 1876 Zirkel announced its discovery in Wyoming Territory.

Although the leucite was invisible to the naked eye, Zirkel's discovery was regarded as so important that the locality was named by the U. S. Geological Survey the Leucite Hills. An interesting commentary on the influence of modern science is furnished by a name so given.

Another extra-European locality for leucite is now announced by Von Chrustschoff, who finds it in a lava in the vicinity of the extinct volcano 'Cerro de las Virgines' in Lower California. The rock consists of an ash-gray ground-mass sprinkled with rounded spots of brownish-black obsidian or glass, and with light specks of leucite. These light specks are shown by a lens to have a rounded octagonal outline.

The leucite is remarkably clear and fresh, and shows in polarized light the well known twining structure, even better marked than in the leucite of the Vesuvian lavas or of the Laacher-See. While generally in rounded masses, the smaller individuals are often clearly octagonal in outline. The microscope shows the leucite to contain many inclusions, among which are augite, apatite olivine, plagioclase, magnetite, nepheline and glass inclusions and bubbles.—[H. C. Lewis.

TREE PLANTING IN THE UNITED STATES.

From a paper on the woods of the United States and their destruction, in the February CENTURY, Mr. J. E. Chamberlain sums up as follows: "The reasonable conclusion of the whole matter would seem to be that while there is no serious menace to the eastern half of the United States through the loss of forests, there is good reason to urge the preservation of as much of them as possible and the encouragement of new plantations; while in the western half of the country the immediate withdrawal from sale of the whole body of forests belonging to the Government is highly desirable There should be an exhaustive inquiry, at the hands of a competent Government commission, into the subject of the extent of forests belonging to the Government, their location, value, character, etc., the proportion of private lands now wooded, and the apparent dependence or independence, as the case may be, of all sections of the country upon the modifying effect of forests. Exact information is now needed, which could scarcely be obtained except through the efforts of such a commission.

"Sentimental considerations, I suppose, are to be held secondary to the practical in the matter; but they are powerful, and should be aroused in behalf of no object more readily than the woods, which have occupied so large a place in the sentimental life of man from the earliest times."

The official description of Point Loma or *Ponta de la Loma* is as follows: 'This is the southern part of the western boundary of San Diego bay, and the termination of a remarkable narrow spur of coarse, crumbling sandstone, which rises south of *Puerto Falso*, or False Bay, and west of the town of San Diego, to the height of three hundred feet, and after stretching south for about five and a half miles, gradually increasing in height to four hundred and fifty-seven feet, terminates very abruptly. It is covered with coarse grass, cacti, wild sage and low bushes.

The difficulty experienced in soldering pieces of alumnium together or with other metals has been removed in France by the use of an alloy of tin and alumnium instead of pure tin.

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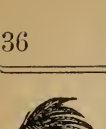

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NORTHERN LOWER CALIFORNIA.

Proceeding southward from San Diego we cross the boundary line between Alta and Baja California in the Tijuana valley, some fourteen miles away. Near by is the spacious adobe custom house of the Mexican government, with flat roof and whitewashed walls, surrounded with numerous wretched hovels and shanties, which show conclusively that we have left the land of Yankee energy and enterprise behind, even before it is out of sight. Three miles further takes us to the hot sulphur springs, which boil up out of the sands of the river bank, bathing in which is said to be so beneficial to rheumatism, and other ills to which flesh is heir.

Driving eastward to the further end of the valley two or three leagues, we reach the old Wildcat station of the San Diego and Fort Yuma stage road of former days, then over hills and through the pretty Carysito valley (where we leave the old stage road) to Valle de los Palmas, or palm valley, where in a few side canyons may be found the most northern of the Californian fan palms growing west of the sierras. The valley is broad, open and sandy, with a fair growth of grass in some seasons and numerous mesquite and cottonwood trees, the latter growing along the river, a branch of the Tijuana.

Following this river we enter a long and rugged canyon with precipitous walls of rock upon the one hand and scarcely less steep hills upon the other. Crossing the clear running stream time after time, through little valleys opening out of the canyon and over rolling hills, the road at last leads us to the fertile and grassy plains of Vallecito, where the present governor of the northern municipality of Lower California, an American by birth, now resides, and where the droves of horses and cattle, and the waving fields of wheat—soon to be ground into flour by a mill on the ranch for the local and Mazatlan markets—showed unfailing signs of present and future prosperity.

Another fifteen miles, across the valley and up and down a couple of little canyons lined with live oak trees, brings us to the Guadaloupe ranch—one of the largest and probably the best ranch in the peninsula—where the proverbial hospitality of Messrs. Flower—three brothers from Michigan—awaits the stranger. Wm. M. Gabb, in his report on the peninsula of Lower California to J. Ross Browne,

gives the following in his narrative of a journey from La Paz to San Diego overland in 1866–7:

'Guadaloupe ranch is by far the best rancho in Lower California. It comprises seven leagues of bottom land, with a stream of water running through it. The land is of great fertility and several acres of wheat and barley, already headed out [Apr. 17, 1867,] showed that it was excellent grain land. There is here also a large orchard of various fruits, including peach, plum, apricot, pomegranate, fig, etc., and a fine vineyard. The grass in the uncultivated parts of the valley was unsurpassed by anything we saw on the whole journey, below or above. Two leagues beyond we camped under a large spreading live oak by the side of a beautiful stream of water gurgling over its pebbly bed, and enjoyed the luxury of a rousing campfire.'

About ten miles below is the San Antonio ranch, near where are the so-called copper mines, of which Gabb says: 'We spent a little while looking at one or two of the copper claims, and saw nothing more than the deceptive copper stains in granite, which have caused so much useless expenditure of money in Upper California.' These mines have since been worked for copper and found unprofitable; but with the copper ore there has been an interesting discovery of a new mineral with a beautiful silvery lustre, which has rendered the continued working of the mines possible. This mineral has been described as Antonite, and is used in the manufacture of fancy papers.

From San Antonio to the sea at Sauzal de Comacho (Gabb gives the name as simply Saucal) is six or eight miles along a couple of little canyons, where we first meet with the buckeyes, the willow-leaved manzanitas, a small currant or gooseberry, and other pretty shrubs like the wild lilacs, the flowering ash, etc.—all of which were in full bloom when first I visited the bay of Todos Santos, presenting to the eyes of our little party of botanists a floral feast that was fully appreciated, and on my part never to be forgotten.

At Sauzal we greet the genial Capt. Center and his son, who own a ranch of some 6000 acres. Here the orange, lemon, apple, pear, peach, apricot, olive, banana and many other kinds of fruits may be found—all in healthy condition and doing well, showing what can be done.

The little town of Encenada—some six miles further along the shores of Todos Santos Bay—contains several stores, another flour mill, an extensive custom house and a few dozen little houses, largely occupied by the soldiers and the Mexican officials. Near by is the little field of Parry's pretty rose, rosa minutifolia, the clusters of the cordwood cactus or *pitahaya agria* as it is called by the Mexicans (an unpublished species of cereus), which produces a gummy, resinous substance occasionally used in calking boats, a large cushion cactus, and various other plants which have this bay for their northern limit.

Beyond are the lands of the new colonization company, where they intend to locate their first settlers—a splendid piece of bottom land, with water near the surface and capable of raising many fruits and vegetables The high hills soon close the valley up into a narrow canyon; following this up we go by 'Purgatory' or Las Animos, where a few English walnut and other trees are in bearing and a nice

spring gushes out of a little side canyon, pass under low-spreading, stunted live oak trees and across a few grassy fields to the La Grulla ranch, where Chris. McAleer greets the traveler with free hospitality. This was the old headquarters of the filibuster, Gen. Walker, who was defeated by the Mexicans and afterward hanged in Central America for raising a revolution. Across the creek from the large two-story house there are about fifty hot and warm springs of water. The place is said to have received its name from the large number of geese which formerly made it a resort.

Passing through the canyon into which the valley again narrows, we descend to the Santo Tomas valley, where a number of houses are situated, some half dozen of which are near the old mission ruins. A group of olive trees surpassing in size any others seen are almost the only traces of early cultivation in the vicinity. Considerable quantities of wine are produced, and a few acres are under cultivation, irrigated by the water from three or four large springs. This pretty valley is some thirty miles in length and contains much valuable land for cultivation.

The steep, rocky hill out of this valley is sufficient to discourage one from going the next thirty miles, through a rolling, rocky country. Plenty of water is to be found, however, along the water courses, a few sycamore trees and seemingly fertile lands along their borders. Mr. Gabb says of the San Vicente ranch:

'It contains several leagues of good, very fertile bottom land and a considerable 'tract of grazing land on the low, rolling hills. A large portion of the bottom land 'seems to have been cultivated during the time of the missions, judging from the 'remains of irrigating ditches winding around the hillsides. Let American enter-'prise wake these people out of their lethargy, and San Vicente will become one of 'the most flourishing ranches of Lower California.

'Our camp was one of the most beautiful I ever beheld. We were on a per-'fectly level tract of a few acres, nearly shut in by a grand old hedge of prickly 'pear; the whole area was covered with a mat of the greenest grass. Back of us 'was a table ten or fifteen feet high, on which stood the not unpicturesque ruins of 'the mission buildings; at our side was a fine stream of water, and overhead the 'dense foliage of a clump of venerable olive trees, in the midst of which we had 'made our camp. The mules luxuriated in the rich, juicy herbage, and we enjoyed 'the beauties of the place to the fullest, leaving it with regret.'

Considerable of the bottom land has been washed out along all the arroyos in Lower California during the past few years, and many fertile canyons have been completely cleaned out of all their vegetation and soil; the heavy floods, which have caused such havoc in Alta California, leaving nothing for cultivation along the former banks of some rivers. This seems to indicate that our floods in Upper California are not wholly caused by the advent of civilization, and cannot be laid to forest fires or the effects of clearing and cultivating the soil.

Near San Vicente are the excellent copper mines which produce very rich oxides and carbonates in large quantities. Extensive shipments of ore have been made at different times, and excellent iron ore exists in the neighborhood in large quantities, but, owing to the heavy duties and other requirements of the Mexican govern-

ment, it has not been found profitable to work them. Near the mouth of the San Vicente river on the sides and top of the steep, high mountains, are hundreds of pretty trees of pinus muricata, some of the little trees scarcely three feet high bearing several full sized cones!

From San Vicente the road leads across a rolling granite country to El Salado, where the ruins of an old adobe announce the failures of others in the past. Then through rough canyons and over a rolling country, passing but a single ranch on the brink of a sandy arroyo, we reach the San Telmo canyon, where a plenty of grass and a large stream of fresh water gives us a pleasant surprise. The upper part of the canyon widens out and contains considerable fertile land where a few vineyards and small orchards are irrigated with ease. Quite a little settlement exists here, as the ranch is owned by several Mexicans and in part by an American, John B. Hyde, who has been a pioneer settler for twenty years of San Telmo and Santa Maria combined.

Leaving the older road for a better and newer, we follow down the canyon till about nine miles from the sea, where we strike off over the mesas, which resemble very closely those that are found on the approach to San Diego from the north, and after some thirty miles of this more or less uneven or sandy road, reach the fine cattle ranch at San Ramon, where a nice spring of water may be found. The people throughout this region are engaged in raising horses and cattle principally, along with a few goats and sheep. The principal agricultural products are beans, which are easily raised in quantity. From San Telmo to San Quentin and southward the country was formerly overrun with rattlesnakes and tarantulas, but at present they are less numerous though still abundant, as several would be seen in traversing the road for twenty miles or so. It was reported that some sailors from the U. S. S. Ranger recently had a grand hunt for these reptiles near San Quentin bay, and after killing a considerable number found a place where they were so thick that they considered a retreat the safest thing they could do.

The following selections from Gabb's narrative above referred to will suffice to complete the present sketch of the coast region of Baja California north of the 31st degree north latitude:

'From San Fernando we rode ten leagues across rolling and hilly country and through another range to a rocky plain called India Flaca or thin Indian, a very appropriate name, since any Indian, or white man either, who should live here a few weeks would be sure to be thin enough. We passed the place called the Agua Amarga (bitter water), or Santa Ursula, where we obtained a supply of water for camp use, and then pushed on to the west side of the above plain. Camping in an arroyo near the western margin of the plain, close to a low range of hills, we found a sufficiency and had cactus skeletons and maguey stumps for fuel. We had become so accustomed to camping without water that we hardly noticed its absence. During this same week we made five 'dry camps,' watering our mules and obtaining a supply of water in our barrels some time during the day.

'On the way to-day we killed a couple of rattlesnakes and after cutting off their heads carried their bodies into camp. To the great disgust of the Mexicans we

cooked and ate them; more, it is true, by way of experiment than anything else. They are, however, very palatable; the flesh is a little tough, but sweet, without bad flavor, and resembles eels somewhat, but is not so greasy. From India Flaca we rode five leagues to Rosario, where we filled our barrel and went two leagues farther to a deep canyon in the coast called the Arroyo Honda, where we made another dry camp. Having passed Rosario, we were told to expect a great improvement in the country. The rocky tracts were to disappear and beautiful valleys were to take their place. Of a truth, there was a great change, but Rosario is rather an arbitiary point; San Quentin would be a nearer approximation to the truth. In the morning rode nine leagues to San Simeon, or, as it has lately been christened, the city of Santa Maria. The road lay along the coast, much of it on the hard sand beach in view of the surf, until we struck inland a mile or two below Sta. Maria. * * * *

'Bidding adieu to the city which is to be, we went eight miles to the salt-ponds of San Quentin. Riding over a low hill. we found ourselves on the margin of one of the lakes. These are some half a dozen in number, and cover areas of from one to five acres each. The salt crystalizes in the mud flat around the margin in sheets nearly half an inch thick. This is collected in heaps and needs no preparation to fit it for shipment. About San Quentin the pasture was exactly like that of Upper California in its best condition. Alfilerilla, alfalfa, burr and red clovers make the greater part of the forage plants, while the yellow poppy, primrose, and other familiar flowers, complete the resemblance. In fact, the belt from here to Rosario may be laid down as the dividing line between the semi-tropical floras of the lower peninsula and the more northern vegetation of Upper California. Many species of cactus disappear soon after leaving Rosario, as well as a large number of other plants with which we had become familiar; and of those which do continue, a large number cling tenaciously to the mountains or highlands, and are even there scattered and thinning out. On the other hand, we had noticed for more than a week one after another of our old northern friends coming in, first scattered, stunted, and evidently away from home, but gradually increasing in size and number, almost insensibly, but none the less surely supplanting their southern neighbors. This overlapping of forms takes place much more markedly in the high land than in the plains. In the latter the vegetation is much more sectional, that is it resembles much more closely the district to which it belongs. As an illustration, an Upper Californian, suddenly transported to San Quentin, would have no special reason to suppose himself out of his state; while if he were placed on the mountains directly east, or even northeast, he would find himself amid the same plants that make the characteristic landscape about San Borja, or even farther south. Two or three miles from San Quentin we saw the last cardon, or columnar cactus; and in the line of demarcation which I had laid down, we encountered the first buckeyes and elders. Chapparal oaks make their appearance between this point and San Telmo, and the hills support, for the first time, a scattered growth of chamiso. The ceanothus, with its little bunches of purplish flowers, appears about the same time.'

C. R. ORCUTT.

THE MORNING AIR.

[Written for the West American Scientist.]

'Tis mine to breathe the morning air,
Upon this balmy shore,
Where breathing is a pure delight,
Rejoiced in more and more.

'Tis mine to breathe the morning air,
Where salt sea-breezes roam,
And flowers through all the sunny year,
Make home indeed, sweet home.

'Tis mine to breathe the morning air,
Where 'tis a joy so pure,
A sweet and glad surprise springs up
Each day to find it sure.

'Tis mine to breathe the morning air,
Where grandeur rules the main,
And all the landscape far and wide,
Is beauty's own domain.

'Tis mine to breathe the morning air,
Where all the orbs of light,
So clear and pure the atmosphere,
Appear supremely bright.

'Tis mine to breathe the morning air,
Where every passing day,
Awakes the grateful heart to praise,
For all the bright array.

And with the Psalmist to exclaim,
'Of all the earth the joy,'
Like Zion's situation fair,
And little to annoy.

'Tis mine where Nature's ways are sweet,
To breathe the morning air,
And ocean waves, like 'evening bells,'
Invite the heart to prayer.

San Diego, California. E. E.

The quantity of poison conveyed in the fangs of venomous snakes appears to be very small, but of very powerful quality. Dr. Vincent Richards, of Bengal, mentions a krait which quickly killed three men and seriously poisoned a fourth by bites given in rapid succession. He estimates that the reptile carried eight grains of liquid venom in its poison glands, which are smaller than those of the cobra.

MOLLUSKS OF SAN DIEGO.—III.

[*Continued from page 30.*]

The Fusidae family contains more or less spindle-shaped shells, without varices; the lip of the aperture not thickened. The only representative of this family which I have found at San Diego is a single beach-worn specimen of Fusus kobelti var. unicolor, which was about two inches long. The variety differs from the type in being more slender and in the absence of the usual chocolate color on the larger riblets.

Siphonalia Kellettii, a large, stout white shell which is rarely found at San Diego, but has been dredged alive in 16 fathoms off Catalina Island harbor in 1873, forms a representative of the Buccinidae family. Large numbers of dead shells of this are sometimes washed ashore at Todos Santos bay, Lower California. The other representative of the family is the Macron lividus of A. Adams, which is not rare on the ocean beaches, where it may be found on the rocks at the edge of the water at very low tide.

The Nassidae are known by several species of Nassa, a genus of world-wide distribution. Our species are:

Nassa fossata, Gould, dead shells of which are abundant, apparently living in deep water; Nassa perpinguis, Hinds, seemingly rare at San Diego, though not rare at Catalina in 16 fathoms. and dead shells are plentiful; Nassa mendica var. cooperi, Fbs., rare at low water at La Playa, also at Todos Santos bay; and Nassa tegula, Rve., abundant on muddy bay shores, where they may often be found collecting to feast on some dead animal.

[*To be continued.*]

FOREST INFUENCE ON CLIMATE.

In a paper before the Royal Meteorological Society of London, Dr. Woeikof stated that the first step towards a scientific investigation of the influence of forests upon climate was taken by the establishment of the Bavarian forest meteorological stations. This example was followed by Germany, France, Switzerland, Italy and other countries. In general it has been found that during the warmer season the air and earth temperatures are lower in the forest than in neighboring woodless pieces; that their variations are less, and that the relative humidity is greater. A discussion of this question shows that in the western portions of the Old World extensive forests materially influence the temperature of neighboring localities, and that the normal increase of temperature of the Atlantic ocean towards the interior of the continent is not only interrupted by their agency, but they cause the summer to be cooler in regions situated further in the interior than those nearer the sea. Hence, forests exert an influence on climate which does not cease at their borders, but is felt over a greater or less district, according to the size, kind and positions of the forests. It follows from this that man may considerably affect the climate by clearing forests in one place and planting others in another.

SINGING SANDS.

[Written for the Scientist.]

For ages the wild Arab had known that there was the mystery of music among the sands of *Jabel Nakous* or the 'Mountain of the Bell,' about three miles from the gulf of Suez. *Jabel Nakous* and one other locality, in the neighborhood of Cabul, were the only places known where the glistening sands sang their evening hymn, until Hugh Miller, author of 'The Old Red Sandstone,' etc., in his 'Cruise of the Betsey,' gave an account of a third locality which he himself discovered.

Miller says: 'It seemed less wonderful that there should be music in the granite of Memnon, than in the loose Oolitic sand of the Bay of Laig. As we marched over the drier tracts, an incessant *woo, woo, woo* rose from the surface that might be heard in the calm some twenty or thirty yards away, and was easily evoked by the foot.'

And now a locality on the shores of Massachusetts has been found where the sands have a similar musical tendency.

Not to be outdone in anything, the sands on the shores of San Diego have a music of their own equal in sweetness to the 'singing sands' of all other localities, presenting the beautiful phenomenon that ever since it was first observed has given rise to more or less superstitions. E. E.

THE POISONOUS SCORPION OF MEXICO.

At a recent meeting of the Academy of Natural Sciences, Philadelphia, Dr. Leidy read a communication from Dr. V. Gonzalez, giving an account of the scorpions of Durango, Mexico, and the deadly effect of their sting. They are found everywhere in the city, and every effort has been made to exterminate them, but without effect. A reward of a cent and a half for males and double that amount for females is paid by the authorities, and the records indicate that some years over one hundred thousand are captured and destroyed. The sting, especially in the case of children, is invariably fatal; the victim, if under two or three years of age, dying in a few hours, and sometimes in a few minutes, in strong general convulsions. No antidote for the poison has as yet been discovered, and the assistance of Dr. Leidy is asked by the writer in his endeavor to determine some successful mode of treatment. It was suggested by Messrs. Horn, Heilprin and Leidy that the Mexican scorpion must differ from the species found in Florida and California, as the sting of the latter is not usually graver than that of a wasp.—*Scientific American.*

[My companion on my recent trip into Lower California was stung by a scorpion (scorpio allenii); the effect upon him was similar to the sting of a wasp. A scorpion the size of a man's hand was reported to be found in the vicinity of San Quentin bay, but its existenoe is doubtful.—Ed.]

A northern blenny, Cebedichthys violaceus, hitherto recorded from Washington Territory southward to Point Concepcion, was found in April south of San Quentin bay, Lower California.

CHARLES OLIVER TRACY.

[We regret to record the death of a dear friend and former associate, whose labors in the field of science bid fair to win him well earned honor and distinction. His studies were m inly devoted to natural history, especially ornithology—on which subject he has contributed much in the *Ornithologist and Oologist*, and in other journals. The following is from the *Vermont Standard*, of May 6, and is by his valued friend, Hon. E. M. Goodwin.—Ed.]

Died at his home in Taftsville, Vermont, April 22, 1886, of consumption, Charles O. Tracy, aged nearly thirty years. He had been failing in health for some time—indeed had never recovered from the assiduous watching and careful nursing of his beloved wife. He endured his sickness with fortitude and very remarkable patience, never complaining, heroically struggling with disease when there was no hope of recovery. Mr. Tracy was a gentleman of culture, of genial and happy disposition, and of exemplary moral character. He was well known and highly respected in the community where he resided, always intimate in good society. He was a true friend of temperance—true to principle, never forsaking the cause when others faltered, or grew weary in battling its enemies; many years a member of Good Templars in Taftsville and filled from time to time its offices of trust and responsibility and always with kindness and courtesy, where his loss will be deeply felt. The loss of him will also be felt by his neighbors and friends, but most especially by his family. To them he was inestimable; to us he was a dear friend and valued associate. He expressed much confi lence in the mercy and loving kindness of God all through his sickness, conversing always cheerfully of his approaching death, and at all times entreated his friends not to mourn for him. His wish and faith are expressed in these beautiful lines of Mrs. Browning:

'And friends, dear friends, when it shall be
That this low breath is gone from me,
And round my bier ye come to weep,
Let one most loving of you all
Say 'Not a tear must o'er him fall—
He giveth His beloved Sleep.'

THE EYES OF SERPENTS.

At the Academy of Natural Sciences, Philadelphia, June 8, Dr. Benjamin Sharp reported that, while recently studying the eyes of serpents, he had observed that in the poisonous snakes the pupils were elliptical, while in the harmless species they were circular. The only exception to the rule, that he was aware of, was in the case of the Elapidae, a family of poisonous coluberine snakes in which the pupil is circular; but in these the poison fangs are fixed, and do not move as those of other venomous forms.

Fine crystals of epsonite are reported from an excavation near Rincon, in Ventura county, in the March number of the *Pacific Science Monthly*.

NEW LOWER CALIFORNIAN CACTUSES.

The following unpublished forms have been known to the writer for several years, but their publication was indefinitely delayed by the death of the eminent authority on this truly difficult class of plants. Possessing the notes upon which Dr. Engelmann decided to base the new species and variety here presented, I venture to now publish them under the names which he proposed. While a more careful study of them and comparison with other forms is desirable, yet it is thought better to give these notes in their present form than to delay further, owing to the distribution of specimens and living plants in various herbaria and gardens throughout the United States and Europe.

Echinocactus Orcuttii, Engelmann, MS. Heads cylindrical, 10 to 18 inches in diameter and 2 to 3½ feet high, sometimes bulging in the middle, growing single or often cespitose, more rarely proliferous at base, with 13 when young, to usually 20 or 22 obtuse tuberculate ribs and a woolly, spineless, depressed top: spines stout, reddish, straight or recurved, all annulated, usually 9 radiating and 4 stouter central ones: flowers deep dull crimson with greenish or lighter colored margins to the petals, 2 inches long, otherwise as in E. viridescens: stigmata green, 16 to 20: fruit pulpy, crimson, scaly, with numerous small seeds.

Palm valley, Lower California. H. C. and C. R. Orcutt, May 29, 1883. Some of the cespitose plants were found with 18 large, well developed heads; young plants usually globose. Occasionally found with E. viridescens at San Diego.

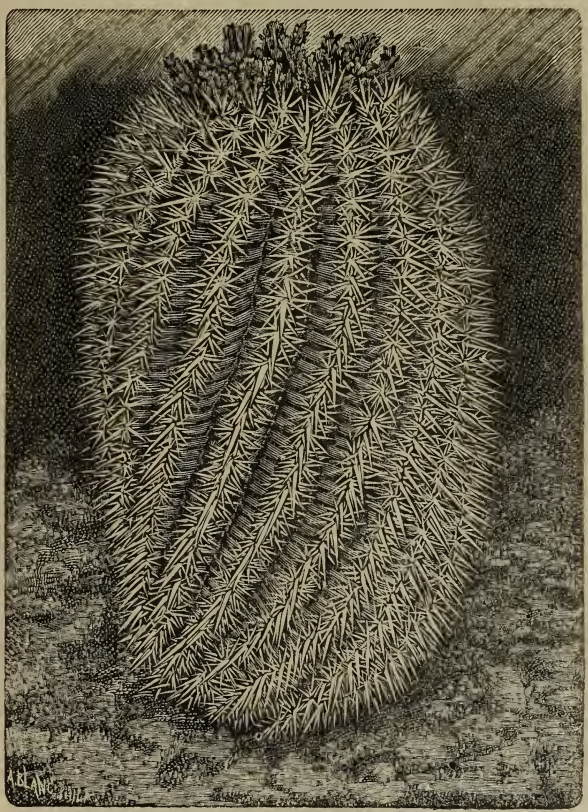
Cereus phoeniceus var. pacificus, Engelm. MS. Plant cespitose, one to four feet in diameter, few to five hundred short stems (6 to 9 inches long and 2 to 2½ inches in diameter) in each, forming dense oval cushions: stems with 10 to 12 obtuse ribs, shallow intervals, and an equal number of internal ligneous fibers: radial spines 1 to 12 and of an average length of ¼ inch, the 4 central spines larger, ¾ to 1 inch long, slender, white: flower an inch across, including the capsule 1½ inches long, the oblong spatulate sepals bright red with a broad purplish mid vein: ovary and fruit with 25 to 30 spiny areolae: fruit fleshy with numerous small seed: stamens slender, as long as sepals; anthers small, red; style ¾ inch long, stigmata 6 to 8, greenish.

Less than thirty plants of this beautiful form are known to exist in its original locality—a rocky canyon near Todos Santos bay, Lower California, where it was found in flower January 25, 1883, by Dr. C. C. Parry, H. C. Orcutt and myself. No other locality has since been found for this consequently rare form, which is probably a good species.

C. R. ORCUTT.

The United States has but five botanic gardens out of the one hundred and ninety-seven in the world.

The active volcano of Kilauea, in the Sandwich Islands, composed of the old Lake Halemaumau and the New Lake, sank from the bed of the crater on March 6, leaving a bottomless abyss about four miles in circumference. The volcanic eruption which has been so active in the past was utterly extinguished.—*Scientific American.*



ECHINOCACTUS ORCUTTII, ENGELMANN, MS.

FOUQUIERA GIGANTEA, NEW SPECIES.

Trunk erect, 20 to 40, or even 60 feet in height, branching above the middle and sending up a few simple stems to nearly the height of the main stem; bark glaucous green, set from the bases of the main trunk and the branches to their summits with numerous small leafy twigs (an eighth of an inch in diameter and 4 to 20 inches in length): leaves spatulate to ovate, ½ inch to an inch long, the primary attenuate into a rigid petiole and the blade and inner portion of the petiole at length deciduous (as in F. splendens), leaving the dorsal part as a stout divaricate spine an inch long or less, the axils producing several sessile leaves: flowers produced at the summit of the stems on short pedicels in nearly simple racemes six or more inches long: corolla unknown, *said to be white* (?): capsule as in F. splendens but rather shorter: seeds unknown.

Abundant near the missions of Rosario and San Fernando (near the 31st degree N. lat.) in Lower California, and said to extend far to the south and into Mexico. Known to the Mexicans as the *cereo*. The large pith is said to be eaten with a relish by cattle, and the hollow trunks are excellent hives for the numerous swarms of wild bees in that district. As there are no other trees in that arid region, except a few large cactuses, this forms a prominent feature in the landscape and is well described as a huge inverted carrot. The stem consists of a large pith surrounded by ligneous fibres nearly a half inch thick, another pithy layer an inch thick, and then numerous small woody fibres next to the thin epidermis.

C. R. ORCUTT.

EDITORIAL.

We are informed that the volcano Cerro de las Virgenes, in Lower California, referred to on p. 33 of the current volume of *The Scientist* as extinct, is in an active state.

We would thank the following authors for valuable publications received: Hon. E. M. Goodwin; Chas. E. Putnam; H. B. Baker, M. D.; Dr. Asa Gray; Geo. H. Perkins, Ph. D.; Verplanck Colvin; C. B. Bradley; Prof. Sereno Watson and others.

Amateur journalism, we are pleased to record, made its first appearance in this county in the neat 'Voice of the West,' May, 1886. May others follow.

A fine portrait of Dr. Asa Gray appears in the June 'Century,' with an interesting account of Harvard's botanic garden and its botanists, by Ernest Ingersoll.

It is intended to publish this journal with greater regularity in the future, and to make it of greater value to all its patrons. To do so, however, it is necessary to have a much more liberal support and more assistance from those who are interested in the work. While it may be devoted largely to horticultural or kindred subjects, yet no pains will be spared in sustaining its character of a popular scientific monthly. If the reader has not already subscribed, we would extend our invitation for him to do so at once. We would thank the many new subscribers who have sent in during our absence in Lower California.

ROADRUNNERS CORRALLING RATTLESNAKES.

Considerable doubt has existed as to whether this curious bird was an enemy to the rattlesnake or not. The following account of the roadrunner's method of destroying a rattlesnake was given by one of the eye-witnesses to the novel affair, which would seem to remove all further doubt:

The bird first attracted the snake's attention, causing it to coil and take a defensive attitude, when it quickly and skillfully surrounded the dangerous coil with a formidable hedge of the joints of the common cholla cactus. When all was ready it tempted the snake to make the fatal strike, for in striking the snake hit against the hedge of cactus and in its writhing became completely covered in a few moments with the tenacious joints. In this condition it of course was an easy prey to the wary roadrunner. The bird, after pecking out the snake's brain, was seen to carefully strip the body of its horrible spiny winding sheet, and is supposed to have eaten it later.

A DOUBLE ORANGE.

My attention has been lately called to an interesting variety of orange which has been for sale in this market [Cincinnati, O.,] said to have come from California. The fruit is about the size of a medium orange, with a slight swelling at the upper end. Dissection reveals a small orange almost completely enclosed in the skin of the large one. The core runs from the stem to about the center of the fruit, and is of about normal size. Then it expands, and for half of the remaining distance is more than twice its previous size. At this point is situated the small orange. This is composed of from seven to eight segments arranged as in the main orange. No seeds are found in the fruit, and it is sweet and juicy. This duplication of fruits was observed not in one orange alone, but in a whole box, and perhaps exists in more. At the upper or flower end of the fruit the skin does not wholly inclose the pulp, but exposes the segments of the smaller orange.—Jos. F. James, in *Bot. Gazette*, Apr. 1, 1886.

There are some trees eminently fit to put next the sea to shelter others of greater value. In looking for the trees and shrubs fittest to plant along the shore, we find that several of the native Australian species are excellent. Fabricia loevigata forms a dense, evergreen hedge, and withstands the severest gales. The Melbourne *Leader* considers it the best tree for littoral planting. The Banksia littoralis and B. serrata come next in value for wind-break purposes. The Fabricia, however, is so easily transplanted and grows so fast that it should be tested in all the seaside towns and landings of California. Pine trees also often do well along the sea coast.

Dr. Edward Tuckerman, professor of botany in Amherst college, died March 15. He was born in Boston December 7, 1817. His special study was lichens, upon which he was an eminent authority.

NOTES AND NEWS.

The 'Asa Gray Botanical Club' was organized in Utica, N. Y., on Mch. 5.

Petroleum has been rediscovered in Egypt in large quantities.—*Union*, May 19.

A shark recently received at the Smithsonian had two sword fish swords in his head.

'Tidings from Nature' has been sold to the publisher of the 'Hoosier Naturalist.'

A queen bee is the only live thing allowed by the U. S. postal authorities in the mails. Horned toads are frequently smuggled through, however.

The air of different places seems to vary little in its proportion of oxygen and nitrogen, air lately brought from Cape Horn being about like that of France.

Wm. Ireland, jr., has been commissioned by Gov. Stoneman as state mineralogist for four years, vice Henry G. Hanks, whose resignation took effect on May 31st.

The captain of an Australian schooner, Mr. T. H. Griffiths, reports the setting fire of his vessel by a meteorite on Dec. 12th, while in latitude 23 degrees 53 minutes north and longitude 143 degrees 26 minutes west. No shock was felt, but two or more hot metallic pieces as large as a man's hand were picked up.

The botanic gardens of the world, most of them scientific in character, are reported to number 197, of which Germany has 34, Italy 23, France 20, Great Britain and Ireland 12, West Indies 6, and the United States 5. More than half are supported by government, and only five per cent by private enterprise.

The ornamental Pisonia grandis of Australia has seeds like an elongated barley corn, which are covered with a very sticky gum. This adheres to the legs and feathers of winged creatures coming in contact with it, and makes the plant a natural bird-catcher, no less than a hundred birds having been known to be captured by one tree in Victoria.

The precipitation method of treating sewage is to be adopted in London on a large scale. The sewage is left in tanks and the separation of the solid portion is hastened by the addition of lime and protosulphate of iron. The liquid becomes as clear as fresh water, and may be drained into the Thames; while the solid matter is to be pressed into blocks for transportation to the sea. The process has been tried experimentally for some months, but is now to be applied to 9,000,000 gallons of sewage daily.

A writer in China claims to have discovered a record of the existence of a speaking phonograph in that country as far back as the seventeenth century. The instrument is mentioned as the 'thousand-li speaker,' and the description is as foflows: 'It was a bamboo tube covered with a disk of glass and opened by a key. After speaking into it several thousand words, it was closed and carried to a distance not exceeding a thousand li. On opening it and applying the ear, a voice was still distinctly heard. If carried a greater distance the voice became indistinct'. Dr. Macgowan suggests that indistinctness might result from injury sustained by the apparatus in a long trip over the rough roads.

SCIENTIFIC SOCIETIES OF CALIFORNIA.

I.—Directory.

California Academy of Sciences, San Francisco: George Davidson, A. M., Ph. D., Pres.; S. B. Christy, Ph. D., Cor. Sec.

California State Geological Society, San Francisco: Henry G. Hanks, Pres.; S. S. Heydenfeldt, jr., Sec.

San Diego Society of Natural History: George W. Barnes, M. D., Pres.; Miss Rosa Smith, Cor. Sec.

San Francisco Microscopical Society (P. O. box 1327): C. M. Kinne, Pres.; Charles W. Banks, Cor. Sec.

Santa Barbara Society of Natural History: H. C. Ford, Pres.; Mrs. R. F. Bingham, Cor. Sec.

Humboldt Society of Natural History, Arcata, Humboldt county: Carl C. Marshall, Sec.

Ventura Society of Natural History, San Buenaventura: Stephen Bowers, Pres.; J. S. Collins, Sec.

II.—Proceedings.

San Francisco Microscopical Society.

Mar. 24, 1886. Resplendent rosette-shaped crystals of brucine, an alkaloid extracted from the bark of Strychnos nux-vomica, were shown under polarized light. E. H. Griffith, of Fairport, N. Y., was present as a visitor, and presented the society a handsome 'Griffith self-centering turn-table.'

A slide of the fossil deposit at Barbadoes was shown by Mr. Norris. It was noteworthy by reason of the large number of diatoms found, together with the polycystina of which the Barbadoes deposits usually consist. Of the former, the discoid forms predominated.

A most interesting demonstration of the capabilities of the Oxy-Hydrogen microscope was given by Edward W. Runyon, of the California College of Pharmacy, for which the society gave a unanimous vote of thanks.

April 14. Communications—Dr. Henry Ferrer, on 'Germs of typhoid fever,' accompanied by exhibitions of bacilli; Mr. Wickson, on a case of trichinosis, which proved fatal to a young German at Livermore, with an exhibition of specimens of Trichina spiralis; H. G. Hanks, on 'The so-called 'Inyo marble' and California building stones in general.'

May 26. Dr. Stallard exhibited slides illustrative of arteritis, or imflammation of the arterial blood vessels. A letter was received from J. C. Rinnbock, of Vienna, enclosing specimens. Prof. Hanks offered a resolution, which was unanimously adopted, as follows:

Resolved, That the San Francisco Microscopical Society appoint a committee of three, and extend an invitation to all scientific societies in the state to appoint similar committees to meet in conference and consider the propriety of extending an invitation to the American Association for the Advancement of Science to hold their annual meeting of 1887 in the city of San Francisco.

Ventura Society of Natural History.

February 1, 1886. Gen. Vandever, on 'Evolution.'

March 1. Mrs. R. W. Summers, on 'Alpine botany."

IMPORTANT TO HOUSEKEEPERS.

It is perhaps not generally known that wool can be dissolved until nothing is left visible.

John Ritchie, jr., has the following in Science Observer: 'This melting of wool is indeed an instructive experiment, and is of sufficient character to be shown even upon the platform.' And the author then and there with an alkaline solution and hot water, into which he dropped the wool for three minutes, explained: 'The wool disappears in the liquid, just as sugar does in your coffee.' A soap of wool alone is left, the fiber has disappeared.

Mr. Ritchie then cautioned housekeepers to be careful in the use of soap powders, as an indiscriminate use may dissolve out the wool from their clothing.

HISTORY OF TELEGRAPHY.

The 17th of last April was the centenary of Baron P. J. Schilling, the inventor of the electro-magnetic telegraph, born in Revel, Russia, 1786.

His first experiments with copper wire as an electrical conductor were begun in 1810. In 1812 he successfully exploded a mine across the Neva by means of an electric current. The same experiment was publicly repeated in 1814, on the Seine, at the triumphal entrance of the Russian Czar, Alexander the First, into Paris.

In 1815 Baron Schilling began to investigate the action of electrical currents on a magnetic needle, and in 1820, after numerous experiments, he constructed the first electro-magnetic telegraph.

The Czar Nicholas, inspecting the invention at the house of Baron Schilling, had written on a piece of paper, 'Je suis charme d'avoir fait ma visite a M. Schilling,' and the words were afterwards transmitted by telegraph without any mistake.

In 1837 Baron Schilling received an imperial order to connect St. Petersburg and Cronstadt by a telegraph line; unfortunately the inventor's untimely death—26th of June (7th of July) of the same year—prevented the realization of this plan.

Baron Schilling's contemporaries, as it so frequently happens, were entirely unable to appreciate his great invention; so, when explaining it before a scientific committee, he proposed to hang the wires on poles, his plan was received with laughter and derision. 'Your invention is pure nonsense, and your airy wires are truly ridiculous.' Such was the answer from the scientific body.—*Scientific American.*

The brain of a lioness has been dissected at Berne, and found to be in many respects intermediate between the dog's and the cat's brain.

San Diego is enlightened evenings by the electric lamps now.

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The West American Scientist.

VOL. II. JULY, 1886. No. 17.

A BOTANICAL TRIP.

On the 30th of last March I and a companion left the city of San Diego with a two-horse team, a snug camping outfit and what provisions we expected to need during the next two or three months. Along the Tijuana, after crossing the U. S. boundary into Lower California, we passed through extensive fields of alternate patches of blue, white, pink or yellow flowers, which are a peculiar feature in Californian landscapes in spring-time. Tall yuccas reared their stately heads of wax-like flowers among the bushes or on the open hillsides, lending a tropical beauty to the scene.

On April fool's day we left the old Wildcat station, passing through large fields of malva as high as our horses' backs and cross over the rollling hills to Carisito, where we again pitch our tent in sight of the sombre black hills of the border which rose above us to the right. A little rain during the night made the beautiful meadows of green and gold glisten in the morning as we passed on to Valle de los Palmas—the Valley of Palms. On the adobe hills I again collected Heterodraba, an inconspicuous cruciferous plant that was first discovered in the same place in 1882.

Spending but a short time in the valley, we entered the long and narrow canyon leading out, following as best we could the single wagon tracks that led before, from which to deviate meant an impassable road. The road was largely under water and composed more or less of treacherous quicksands so that the greatest care was necessary to avoid a serious accident. Reaching solid ground at last we pitched our tent on a level plat covered with abundant feed for the wearied horses, and gave them several days for recruiting. Scutellaria tuberosa, a little labiate with blue and white flowers, was our only discovery here worthy of mention.

Monday, the fifth, we leave our camp and Vallecito behind, camping near the fine Guadaloupe ranch of Messrs. Flower, for whom we kindly dispose of our canteen twice full of milk—equivalent to four good sized pans full—before we bid them adieu. As my cousin and I are both from the old Green Mountain State, we are able to handle 'Lake Superior' *(leche pura)* without any inconvenience.

The river we found was impassable at the old ford, so crossing a field of mud further up the valley, we find a place where teams have settled the quicksands into a hard bottom, making it safe to cross. Singing 'Glory, glory, hallelujah,' with a

few variations suitable to the occasion, we enter our camp for the eighth night, beautifully situated in a grove of live oaks and by a clear running stream, in season to escape driving in the rain, which continues throughout the night and the following forenoon. In the afternoon of the 7th we proceed to Sauzal, where another successful raid on 'Lake Superior' and hens' nests is made.

Spending April 8th in exploring the cypress canyon near by, revisiting the locality of a new cushion cactus discovered in 1883, we make a few interesting 'finds,' and then to camp, where a pleasant evening is passed 'swapping lies' with some of the old settlers. Among some of the interesting 'facts' of a scientific character was an account of a 'trout weighing a pound and eleven inches,' a graphic sketch of the whales chasing men ashore up into trees and then kicking at them with their tails in the vicinity of Magdalena bay, a complaint of how difficult it was to raise potatoes in the region on account of the ababones* coming ashore in the night and digging and eating them, with the statement that abalones preferred potatoes to wheat, and various disquisitions on the flea, mosquito, bed-bug, bear and other noxious insects. The company would have entertained any scientific audience with their original observations of nature.

The 9th of April we pass through Encenada, and along the shores of All Saints bay, by magnificent fields of the golden California poppy, phacelias, layia elegans, orthocarpus, baerias, larkspurs, platystemon and other delicate annuals and perennials which lent an added charm to the beautiful view of land and sea that was spread out before us on every hand. And thus for mile after mile we alternately contemplate the rich garden of flowers and the beautiful scenery.

On the morning of the 10th a deer looks in upon us in the early twilight, and as silently vanishes from our sight. Find a few flowers of the pungent spice-bush, ptelea aptera. A noted botanist tasted of the ptelea in 1850, and upon seeing the shrub again (in 1883) remarked that he could 'taste it yet'—but he did not seem to choose to do so! Breakfasting on pinoche (hard cakes of sugar made by Mexicans, resembling maple sugar somewhat) and pickles, we bid good-by to another camp and travel up the La Grulla canyon till we reach a fine camping ground by dwarf live oak trees (the last we are to see till we return) and clear running water. Selecting a place where our heads will lie down hill and the water can run into the tent, we make camp. Without an elaborate breakfast and no dinner, our supper of griddle cakes and melted pinoche was quite welcome. Saxifraga reflexa and Habenaria cooperi were found near by camp, and were the most important discoveries made between the showers, which continued during Sunday and Monday.

However, the 12th we break camp, pass Santo Tomas, and collect a new Isoetes with Pilularia Americana in a little temporary lagoon which we find among the hills beyond. Also re-collect the tetracoccus in full flower.

The 13th, fix the roads some, collect numerous gold ferns and notholaenas and then ride in the rain to Guadaloupe ranche number two, where we were hospitably treated by the Senora Moreno and her son and daughters, and succeed in drying

*The abalone is a large mollusk nearly as incapable of motion as the oyster, we would state for the benefit of those unacquainted with it.

ourselves off before partaking of an excellent dinner of corn bread, succotash, beef and coffee. A sewing machine, table, rocking-chair, a good stove and other conveniencies testified to their enterprise, which became more apparent when we reached the next ranch, where we found the owner surrounded by a pack of Indians —all drunk!

The 14th find an opportunity to send a letter home. The roads were found to consist either of a wash where the brush had been cleaned away by the rains, or of a couple of rabbit tracks running parallel to each other; when one track diverges from the other, then there are two roads, each leading differently, as we found to our sorrow. Many of the houses are made of mustard stalks tightly bound to a framework of poles, often forming only a circular corral, sometimes only two feet high and without a roof, but the more pretentious residences of the natives were square and provided with a roof. The discoveries of the day consisted of a new species of cereus and Chorizanthe Fernandina, which kept us company on the rest of the trip south, with a beautiful new dalea (D. Seemanni, Watson, n. s. p.) which was just coming into flower on the hillsides near San Rafael ranch.

April 15th we s e acres of Parry's wild rose, which was also found as for south as the trip extended. Everywhere agave Shawii is to be seen, and under the dead trunks of several I was delighted to find a few specimens of the island binneya no tabilis, an interesting looality for this snail.

Just before reaching the San Telmo canyon I saw the last of Arctostaphylos bicolor, adenostoma fasciculatum and other northern shrubs. At San Telmo we met Mr. Hyde, an American who has lived in this region for the last twenty years, and learn that the San Ramon creek that is before us is impassable, owing to the melting of the snow on the great San Pedro Martia mountain having filled it to the banks. Consequently we go down the canyon till about nine miles from the sea and prepare to camp for a few days till the swollen river becomes again passable.

Our camp was near the mouth of the large canyon, with steep banks on either hand, and a large creek of clear water flowing through and numerous deep pools of an inviting aspect to bathers.

A new phacelia (P. hirtuosa, Gray) was the first stranger to attract my attention here, as I wandered among the agaves and cactuses, and among the rocks where cotton ferns, Notholaena California and others grew in great luxuriance. Nearly all the familiar plants which I find in the canyons near San Diego, such as collinsia bicolor, Parry's phacelia, mimulus brevipes, krynitzkias, chaenactis, galiums, polycarpon depressum, porophyllon gracile and numberless others were found in abundance and of a luxurious growth during the few days spent in this camp.

In roaming about it was not long before the beautiful red and white bladders of an interesting plant, which forms the type of the new genus Harfordia described recently by Dr. Parry, attracted my attention among the small bushes on the hillsides where the slender stems climbed up to sunlight, and as I became better acquainted with what was not a total stranger, since I had been previously introduced to a fragment by Dr. Parry and earnestly exhorted to seek a further acquaintance, I found the sterile, bushy little plants growing openly by themselves among the rocks, not seeking the support which the slenderer, twining female plants required.

Another interesting discovery was here made, Saccularia veatchii, or as it is more properly called, Galvesia junceum, which I recognized at once from the colored plate published in Bulletin No. 3 of the Calif. Acad. Sci.

The 19th of April we leave this interesting locality and drive along near the ocean beach on a broad mesa, which, from the presence of agaves, Emory's cereus, and sphaeralcea, resembled the mesa south of the monument between the U. S. and Mexico. Franseria chenopodifolia, Rosa minutifolia and Harfordia were all prominent along the beach and southward in places. A white form of gilia dianthoides was also abundant, and rattlesnakes became rather too much so to suit Frankenia Palmeri, layia elegans, abronia umbellata and numerous other species common at San Diego were found abundant here and also further south, beautifying the otherwise long and dreary drive of thirty miles to the San Ramon creek, where we pitched our tent for our 21st night.

Here I discover a couple kinds of minute shells, pupas, and a few helices. The next day we cross the creek, which had so far receded as to be scarcely over our horses feet, making the offered help from Mr. Hyde unnecessary. A band of cattle had been previously driven across, which had settled the sands sufficiently to make it safe crossing. In company with Mr. Hyde, we start for his San Quentin ranch, Santa Maria, and drive over ten leagues of the best road we had seen south of the line of equal extent. Trees and shrubbery of all kinds seemed to have disappeared. Only a single cluster of baccharis and another of rhus laurina were seen south of the creek along the whole road. The tall stems of Cereus Schottii shot up in a few spots, chollas were common—and little black flies also. The big mountain east was white with snow. Meet a wagon—the first for many days. Find Echinocactus Emoryi abundant, with its beautiful red or purple flowers in great profusion. Find a few plants of pholisma arenarium, an abundance of pogogyne serpylloides, mimulus inconspicuous, and a few San Diego plants around a large lagoon of fresh water near the hills, where I shoot another rattlesnake. Mosquitoes plenty.

April 22d, we start with a blanket, a small quantity of provisions and our horses—bareback—to explore a neighboring canyon, leaving our wagon at Sta. Maria. Discover the giant columnar cactus, or *cardon*, as it is known to the Mexicans, which proves to be the Cereus Pringlei, lately described from Sonora. Yucca Whipplei was also in magnificent flower. Several species of Astragalus were found on the plains—a genus of which the entire region seems prolific in species. Near the mouth of the canyon I found the blue palm, a tall tree laden with fast-ripening fruit, and numerous younger palms, but all Erythea armata, though it is said that another species of palm is found in this canyon.

This canyon proved a rich locality, and though it was too late and dry to find any of the delicate annuals that would be characteristic of the country, yet it yielded a variety of nice perennials. A simple list of some of the species collected or observed will be of interest to botanists:

Viguiera Parishii,
Mentzelia multiflora,
Eucnide cordata,
Phaseolus filiformis,
Gymnogramme triagularis,
Rhus laurina,
Hyptis Emoryi,
Nemophila racemosa,

Solanum Hindsianum,
Coldenia Palmeri,
Encelia farinosa,
Achyronychia Cooperi,
Pentstemon Palmeri,
Lyrocarpa Palmeri,
Ellisia Torreyi, var. Orcuttii,
Delphinium cardinale,
Lycium sp.,
Abutilon Lemmonii,
Abutilon Newburyi (?),
Agave Shawii.

Return to Santa Maria on the 23d, and stay over the 24th and 25th to recruit up. On the 25th we wake up only to find the coyotes have cut the picket ropes and let our horses loose, but fortunately they are found for us late in the afternoon of the next day.

The 27th of April we leave Santa Maria early, driving on the ocean beach to a place called Socorro, some twelve miles distant, where a small fresh-water lagoon empties into the sea. Thousands of Indians are said to have resided at this place in former years, but not a vestige remains at the present day. At Socorro we found a few lichens, shells, a young palm tree, and various nice plants of which I will mention Dalea Seemannii, Nemacaulis nuttallii and a variety, Æsculus Parryi, Euphorbia micromera, drymaria viscosa, n. sp., Astragalus Hornii, A. Menziesii, a new cotyledon, a hosackia, Biscutella Californica, Oenothera crassifolia, etc.

The 29th leave Socorro, follow the mesa along the ocean beach for nearly twenty miles, and up a long valley without water or trees until we reach a high table land covered with numerous agaves, or maguey plants, as they are called. This entire mesa we found strewn with the dead shells of helix levis and stearnsiana, and occasionally a living shell under the agaves. A curious lichen, Eriogonum scalare (just coming into flower), Oenothera cardiophylla and Astragalus Nutta lianus were among the plants of interest which made an appearance during the day's drive. Descending from this mesa we reached the valley where the old mission of Rosario lies in ruins, surrounded by quite a settlement of perhaps a dozen houses. As it was getting late we were obliged to stop at last near the old mission ruins, without getting good feed for the horses; but the next morning we changed camping grounds for a better location where abundant alfilleria was found, though too scattered to be called good feed.

The bells at the old mission were dated 1738 and 1800 respectively. A little building that formed a part of the former mission contained the Catholic images, banners, pictures, beads, and various other regalia for feast days and other occasions.

May day found me climbing the hills around, gathering the fruit of the mamillaria cactus, which has a pleasant flavor like that of the wild wood strawberries such as I used to hunt in old Vermont, turning over agave stumps in the vain hope of finding more shells, and picking a supply of such flowers as came in my way. Fouquiera splendens was found with its beautiful crimson flowers, a curious Nemacladus was discovered in a seemingly precarious situation where it was scarcely obtainable, owing to the steepness of the bank where it grew, and chorizanthe fimbriata, chorizanthe procumbens, chorizanthe Lastarriaea, calandrinia maritima, various krynitzkias and a Ieerityle were found.

The day was rendered memorable to my companion by his learning how to milk

—a Mexican cow! Briefly, it required the services of a man, a woman and a boy, a rope, a cow, a calf and a corral. The process was repeated twice and the result from the two cows presented to us in compensation for a Mexican bit. A fresh supply in the morning consumed the day—or rather we consumed the day consuming the *leche pura.*

Willows, elders, and other northern shrubbery grew along the watercourse in the valley—said to be the last to be found in the peninsula in going south. On the dryer lands in the valley we found various kinds of acacias, one of them, Acacia Farnesiana, emitting a very strong fetid odor upon being cut, so strong at first as to be almost unbearable.

Engaging a boy with a pony, for a guide, at 50 cents a day, we proceeded toward San Fernando mission on the 3d of May, leaving Rosario valley behind. The country began to show unmistakable desert characteristics. Trees and shrubbery are not, water has leaked out, and only rattlesnakes and cactus seem to remain. Four or five unfamiliar species of chollas (opuntias) were found. Echinocactus Emoryi was measured and found to be eight feet from the base to the summit of the stem. Giant columnar cactuses, Cereus Pringlei, stood out prominently on every side, some as much as thirty feet in height, and other cactuses like the cordwood cactus, the cochal, Schott's cereus, etc., were in abundance. The wild date or 'datiles' a giant yucca some thirty feet in height and two feet or more in diameter near the base of the trunks, here makes its most northern appearance in the peninsula. Notwithstanding the dry state of everything, some few nice things were found along the bottom of the dry arroyo; most of interest of all was a new species Chitonia simplicifolia, Watson, a small shrub that grew along the sides of the wash. Hyptis Emoryi, a new Euphorbia, various composite plants, verbena ciliata, etc., were the most prominent discoveries.

This day's journey brought us practically to the head of navigation with a team. Wagons have been a day's journey beyond, but not very recently, and the road was said to be impassable at the time. Scarcity of water and total lack of feed for the horses turned us northward at the dawn of another day, and reluctantly I bid goodby to the cereo (Fouquiera gigantea) whose acquaintance I had but just made. This curious tree, which we found on this last day's drive southward in the greatest abundance (described in the WEST AMERICAN SCIENTIST, ii, 48), was one of the most characteristic and interesting discoveries made on the whole trip. It forms the fifth well-marked species of an anomalous Mexican genus.

The last object to be remembered in this interesting region was a tall Echinocactus or turk's head cactus, standing beneath a large cereo, the entire side covered with the climbing stems of Harfordia and ornamented freely with the bright and delicately tinted bladder-like fruit, a vision of beauty in the desert not soon to be forgotten.

C. R. ORCUTT.

The attention of medical men in France has been directed to a new sleep-producing drug called hypnone, a distilled mixture of acetate of lime with benzoate of lime. It is claimed that the new drug produces none of the unpleasant after symptoms of opium.

NOTES AND NEWS.

Rev. E. L. Greene is botanizing on the Santa Barbara Islands.

The June number of this journal was issued rather late,—on July 1st.

The fall of a meteor on ice was lately witnessed on the coast of Norway, a hole a foot and a half in diameter being made through eight inches of ice.

A gradual increase in the average size of the skull among the natives is believed by a Bombay physician to be taking place as an effect of civilization in India.

A French botanist, M. Buysman, has enumerated 378 species of plants growing in Greenland, and he finds that they resemble those of Lapland more than those of the American continent.

The schools of Austria have been forbidden using paper ruled in square or diagonal lines, as such paper has been found to injure the eyesight of pupils. In future paper only plain or ruled straight across is to be used.

A novel gas-light, devised by Dr. Auer, has been in operation in a chemical laboratory in Vienna. A cotton wick, saturated with an incombustible metal solution, is introduced into the flame of an ordinary Bunsen lamp, the result being a light similar to the incandescent electric light.

Attention has been called to the fact that the streams in certain cultivated portions of northern Texas now run during the part of the of the year when they were formerly dry. This is not attributed to any change in the rainfall, but to a more even absorption of water over the cultivated areas.

In Japan, according to a government report, 553 earthquakes occurred during the nine and a half years preceding December, 1884. The record is evidently incomplete, however, as Prof. Melne has been able to trace an average of an earthquake a day in Nagasaki, in the extreme south of Japan.

Dr. C. C. Parry characterizes a new genus of Eriogonae, in Proc. Davenport Acad. Nat. Sci., V. 26-28. The type is the Lower California Pterostegia macroptera, of Bentham, and the genus is given the name of Harfordia in honor of Mr. W. G. W. Harford, the efficient curator of the California Acad. Sci.

An ingenious astronomical theory is that of Mr. Monck, of Dublin, who suggests that as shooting stars are known to be dark bodies rendered luminous for a short time by rushing through our atmosphere, new stars are dark or faintly luminous bodies which acquire a short-lived brilliancy by rushing through some of the gaseous masses—visible, perhaps, as nebulæ—which exist in space.

A member of the London Microscopical Society has described a case illustrating the value of the microscope as a detective agent. Fraudulent additions were made to a bond, and the ink being darker than the original the forger traced over the whole writing to give it a uniform shade. Under the microscope the difference between the original and the added portion was clearly discovered and the forgery established.

CALIFORNIA DIAMONDS.

For a period of more than thirty years the placer miners of California have occasionally picked up small diamonds. The hydraulic washings at Cherokee, Butte county, have been the most prolific. The diamonds are usua ly found by the miners when cleaning up their sluices or while washing off the bed rock, though in some few instances they have been picked up on the surface. As a general thing the gravel in which they occur is mixed with lava, ashes, or other volcanic matter; zircon, platinum, iridium, magnetite, etc., being associated wi h the diamonds. While many of these stones have been of good color, brilliant and perfect none weighing over 3½ carats have been found in the state. In size they have ranged usually from about half a carat down to stones of microscopic dimensions, the latter being numerous in a few localities. So far as known $500 is the highest price for which any California diamond in the rough has been sold, though large numbers have found purchasers at prices ranging from $10 to $50, and not a few at as much as $100. The stones have been of all colors, white, yellow, straw, and rose, and many of good water. A few small diamonds have been found also in the placer diggings of Idaho, being of about the same quality and occurring under the same conditions as in California. In neither region have diamonds been made the object of special search, those found having been picked up by miners while washing gravel for gold. Fragments of diamonds have been noticed in the tailings from the quartz mills, being the remains of stones which have been broken under the stamps.[—C. G. Yale, in "Precious Stones."

CORUNDUM.

This mineral has long been used in the arts as a preferable substitute for emery. Its scarcity, and the expense of mining, has prevented its extensive use for the ordinary purposes to which emery is adapted by reason of its abundance. Corundum is crude sapphire, and in hardness ranks highest of all minerals excepting the diamond. Its use for grinding wheels is in great demand, the superior quality of these over emery wheels having been demonstrated for nearly every purpose. It requires an extreme degree of heat to fuse the mineral. and grinding wheels made of it are said to be subjected to fully 3,000 degrees, in the process of solidification. This imparts a capacity of resistance to centrifugal force not attained in any process of making up emery wheels, beside adding materially to the hardness of cutting quality of the wheel.

In some of the English collieries experiments have been made with 'water cartridges,' in which the gunpowder of the charge is completely surrounded by water. It is stated that no flame followed the explosions, even when heavy blasts were made. The water cartridge and ordinary gunpowder cartridges were fired in bags of coal-dust, the dust being ignited by the latter, while the former simply dispersed it in a dark cloud mixed with steam. The new cartridges are expected to render great service in mines where fire-damp is present.

[Correspondence.]

ON LOWER CALIFORNIA LAND SHELLS.

June 26th, 1886.

My Dear Mr. Orcutt :

Thanks again for shells sent with yours of 16th. The Binneya is, indeed, the notabilis. The genus has been described from Mexico as Xanthonyx, and, before seeing your shells, I thought you might have stumbled on a Mexican species. Your discovery of this genus in Lower California is a very happy one, throwing light upon the presence of Binneya on Santa Barbara Island. Hitherto the nearest point of finding the genus was the Mexican island of Guadalupe. I supposed it was brought thence to Sta. Barbara by birds. Now we may suppose the same agency has been at work, but from the more neighboring Lower California. At all events, it appears that the Cali ornia islands have been peopled from the Mexican fauna.

The larger Pupa is chordata, Pfr.—a species before known only from Mazatlan, as far as my knowledge goes. I have drawn your specimens by camera lucida, in case you want a figure. They are less attenuated at the apex, and have more whorls than the individual figured in Land and Fresh Water Shells of N. A., I. On second thought, I send you my camera sketches. Keep them.

The ofther Lower California Pupa I have not yet identified. It requires to do so a great deal of eyesight, which I prefer keeping for our own molluscs. Then, again, I have not kept *au courant* of late years with Mexican species. I advise your sending the shell to H. Crosse, 25 rue Tronchet, at Paris.

The San Diego Pupa does not seem to me arizonensis, and I cannot spare eyes to determinate it. In my books are enlarged views of the described species of Pupa, by means of which and a pocket lens you can readily make this out. I detest Pupa and Succinea above all things conchological. I give you a camera lucida drawing of the outline of your shell—the aperture was still unfinished when the tube of my microscope slid down on the shell and smashed it, much to my delight.

Helix levis, Pfr., sent by you, is surely that species, though it may be a variety of areolata. I have drawing of jaw, tongue and gentalia at your disposal, if you want them. The jaw is like that of Arionta. There are five distant, robust ribs, denticulating either margin: jaw arched, little attenuated, blunt. Lingual membrane with 38-1-38 teeth, as in Stearnsiana, etc.

Genital system quite like what I have figured (Terr. Moll., V) for Tryoni in general arrangement. The accessory organ, probably dart sac, in levis is longer, and only the thread-like organ attached to its base was detected by me, not the sponge-like process (1 in my figure of Tryoni), but I may have overlooked that.

Now for H. Stearnsiana. The species was originally found by Gabb under stumps of maguey from Santo Tomas to Rosario. It corresponded with your 1321, which has the same genitalia as I have described for Stearnsiana, but this is negative evidence. I think all the shells you send are forms of the same species, which I have always found variable in Lower California—but I am not infallible, and what to me seems varietal difference, to you may appear specific distinction, and you may be as near right as I. Still, I think most conchologists would agree with

me. Of course, I recognize a different look in 1321 from the others. Yours very truly, W. G. BINNEY.

[We give the following brief notes as a supplement to the above interesting letter from Mr. Binney, the well known authority on American land shells:

Glyptostoma newberryanum was found alive under dead plants of a species of Cotyledon in a canyon near Todos Santos bay, Lower California, but was not found further south.

Macrocyclis sportella, a carnivorous snail, and Arionta tudiculata were both found among the hills of Lower California near the United States boundary, but were not seen further south. Arionta traskii was found as far south as Santo Tomas, where it is quite large, and slightly resembling the depressed variety found in the mountains back of San Diego. In this connection I would say that Arionta carpenteri, of the Coronado islands, near San Diego, seems to be unworthy of specific or even varietal rank from a careful examination of numerous specimens of it and A. traskii.

Four living individuals of Binneya notabilis, and one or two dead shells, were found under decaying trunks of the maguey (Agave shawii) at an elevation of a few hundred feet among the hills north of San Quentin bay, Lower California, during last April. Scarcity of water and feed in that locality prevented a careful search for others.

My catalogue number 1320, Helix levis, Pfr., was found in great abundance under the trunks and among the leaves of Agave Shawii, on a high mesa near Rosario, Lower California. Numerous examples of what I considered the typical Arionta stearnsiana, a mottled and elevated shell, were found with levis, and a few of another unmottled depressed species (number 1321) which seemed more closely related to Arionta tudiculata in appearance.

No. 1322, Pupa chordata, Pfr., was found by the thousand under clusters of Rocella leucophoea, a foliaceous lichen that grew in abundance on the bare salt lands along the ocean beach, both north and south of San Quentin bay. Another species, (number 1323) was found with it but in much less abundance.

Succinea oregonensis, Vertigo ovata (?) and a species of Limax form the only other terrestial mollusks which I have fotnd in Lower California north of the 31st degree north latitude, much of which, however, still remains to be searched.

The San Diego Pupa seems to be Gabb's hordeacea. It was found under yuccas on the mesa back of San Diego.—ED.]

Mr. S. Haley, of Los Angeles, who was Captain of the "Sea-bird" in 1856, mentions the occurrence in that year of an earthquake in Japan which caused a tidal wave that in less than three days struck the California coast, destroying twenty-six vessels along our shores. The waters of San Diego bay rose over twelve feet above high-water mark.

Another Pacific coast society is the 'Historical Society of Southern California,' at Los Angeles; Major Isaac Kinley, Pres.; Prof. J. C. Oliver, Sec.

MOLLUSKS OF SAN DIEGO.—IV.

The Mitridae family is represented on our coast by a single species of the genus Mitra (M. maura, Swains), dead shells of which are often washed ashore on the ocean beaches. It is a deep water shell and possesses a smooth black epidermis. The shell attains a length of two inches or more, is fusiform in shape, and is quite solid.

The shells of Marginellidæ are porcellaneous, polished, usually smooth or with longitudinal ribs, covered by the mantlelobes of the animal and devoid of epidermis, thus resembling externally the cowries and olives.

Erato has a short, conical, distinct spire and linear aperture, Both of our San Diego species, vitellina (Hds.), and columbella (Mke.), are quite rare; the former rather more than a half-inch long, and dull reddish-brown above; the latter usually less than a fourth of an inch long and of a delicate brown, greenish or flesh-color, and with a more prominent spire than vitellina.

Our marginellas are all minute and probably abundant on sea-grass or algae at certain seasons. Carpenter's regularis has been found abundant but his slightly larger subtrigona has not as yet been found so. The minute Volutella pyriformis, Cpr., has also been found on sea-grass in the bay of San Diego. The pretily-marked Volvarina varia, of Sowerby, is found abundantly beneath rocks partially imbedded in shell sand, in company with other small shells, ophiurans, and other marine animals. It is about three lines long, of a delicate flesh-color and irregularly marked with wide or narrow bands of reddish-brown.

The Olividae are mainly tropical, brilliantly colored, solid, and smooth, polished shells without epidermis. The well-known and beautiful tent shell, the rice shells of the West Indies, and many others are familiar to many who are not conchologists, and valued for their great beauty. The only members of this family on our coast, are olivella boetica, a small slender shell, a half inch long, with grayish markings, and the familiar 'Indian money shell' of the Pacific coast, Olivella biplicata, a larger, thicker shell (an inch long and ½ inch in diameter), varying in color from white to black, but usually of a purple tint and stained with brown.

Columbella fuscata, a single specimen of which was found on sea-grass in the bay of San Diego, is an extra-limital species of the sub-tropical family, Columbellidae. Our other members of this family are small and mostly inconspicuous. Astyris carinata, and its variety Hindsii, are found abundantly on sea-grass during the spring near the entrance to our bay, and are very variable in form and coloring. Astyris tuberosa is often found washed up along the bay shores, but not alive. Anachis subturrita is another small shell found among oyster shells on wharf-piles, and probably elsewhere, below low-water mark.

The last of this family to be mentioned is a species of Amphrissa (A. versicolor), a genus peculiar to West America. The shell is about a half inch long, slightly inflated, strongly corrugated and very variable in color, usually grayish or more or less marked with brown or of a bright red throughout. It is found with Volvarina and is not rare.

The terebras are known by their long, narrow, many-whorled shells, with small aperature, notched in front, and no true columellar plaits. Carpenter's Myurella

simplex, abundant at low water on the sandy shores of San Diego bay, is the only shell found in our waters of this mostly tropical family (Terebridae), of which the well-known 'marlin spike,' is a member.

The nearly related family of Pleurotomidae, of world-wide distribution, is well represented at San Diego by Carpenter's Drillia moesta, D. inermis, Mangilia angulata and Mitromorpha filosa.

The great family of cones (Conidae), characterized by the thick shell with the whorls enrolled upon themselves, by the short or not elevated spire and the narrow elongated aperature with parallel margins and truncated at base, are principally inhabitants of the equatorial seas. Conus Californicus, of this coast, grows to the length of an inch or more, and is covered with a coarse dark-brown epidermis.

We now come to the large tropical and subtropical cowry family, represented in California by the beautiful nut-brown cowry, Cypraea spadicea, and the much admired 'bug-shells' or trivia. The trivias are easily distinguished by the striae extending over the back of the small cowry-like shell. The larger San Diego trivia is named Solandri, and the smaller, Californica. The latter is sometimes called the 'Coffee-bean shell,' from its rich brown color, shape and size.

The Naticidae, or sea-snail family, are characterized by the globular or oval shell with usually short spire, semilunar aperture without canal or anterior notch, sharp outer lip and the callous columellar lip more or less reflected over the umbilicus. Lunatia Lewissii, Gld., is our largest species of which dead shells are often washed up on the ocean beaches. This subgenus of Natica has a corneous operculum while the next sub-genus has a horny one. Neverita recluziana, Petit, is the large snail generally credited with forming the curious sand ribbons when depositing its eggs. These sand or sea ribbons, or as they are sometimes called, the sand saucers—from their resemblance to the rim of a saucer with the bottom knocked out, are abundant along our bay and ocean shores at certain seasons (in the winter and spring) in shallow depressions in the mud and sand. Something more definite about them would be desirable. The shell of this species is two or three inches across, the reflected white columellar lip completely covering the umbilicus; the inside of the aperture partly of a rich brown.

Sigeretus debilis, very rare at San Diego, more abundant south, is a much smaller, white, ear-shaped shell with revolving striae and is much more delicate than the last, but stouter than the next shell requiring mention, a recently described species of Lamellaria, named Lamellaria diegoensis by Mr. Dall, in Proc. U. S. Natl. Museum, 1885, p. 538.

The animal of Lamellaria diegoensis is much larger than the thin and fragile shell which is completely concealed by the soft parts when living. It has been found at San Diego and at Cape San Lucas.

The metric system of weights and measures which was adopted in many laboratories when first introduced, is said to be rapidly losing ground, having been the cause of some serious errors. The fact that the misplacement of a single dot will turn a comparatively harmless dose of medicine into a deadly poison bears strongly against it.

FELDSPAR.

The different minerals belonging to the feldspar group are composed of silica, alumina, and soda, lime, or potash. They are distinguished from other minerals by their perfect cleavage in two directions, leaving faces that are smooth and reflect the light with a peculiar flash. They are harder than limestone and softer than quartz, which two they most resemble, and are not decomposed rapidly by hydrochloric acid and with effervescence like limestone.

The more common white varieties are mined and used extensively in the arts, and the decomposition of feldspathic rocks results in clay used from time immemorial in the manufacture of pottery.

The Boston "Journal of Commerce," mentioning some of the more precious kinds, says: 'Amazon stone is a bluish green variety of the common kind of feldspar called orthoclase. In composition it is a silicate af alumina and potash. It is an opaque stone with a somewhat pearly lustre, and a hardness of 6, or 6.5, just below quartz. It is quite brittle, but takes a good polish. It was first discovered on the banks of the Amazon, from which circumstance it takes its name. It is found at Lake Baikal, in Siberia, and Pike's Peak, Colorado; also in North Carolina, and Mt. Desert, Me.

Moonstone, or adularia, agrees in composition and hardness with Amazon stone. It has a pearly or silvery reflection not unlike that of the moon, from which it takes its name. It belongs to the cheaper grade of gems, though in some parts of Europe it has at times been much esteemed. The finest specimens come from Ceylon. It is found in this country at Medina, Penn., and in Virginia.

Sunstone is like moonstone in composition and hardness. It is of a yellowish color, reflecting sparkles of light in various directions, owing to minute particles of iron oxide which are disseminated through it. It is found in Siberia, Norway, Ceylon, and in the United States in the same localities as moonstone. It is also called adventurine feldspar.

Labradorite, or Labrador spar, is a variety of feldspar of various shades, the kind used in jewelry having a rich blue color. In composition it is a silicate of alumina, lime and soda, with a hardness of 6. It is remarkable for its beautiful play of colors, and its sparkling reflections, like aventurine feldspar. Though generally blue, green, yellow and red kinds are not uncommon, sometimes pearly gray. Labradorite was first found on the coast of Labrador, toward the latter part of the last century, but has since been discovered in Norway, Sweeden, Russia, Canada, and in this country in New York, Pennsylvania, and various other places.'

The curious and remarkable discovery is reported that a South American shrub called 'aliza,' exudes a juice which acts so powerfully in stopping flows of blood that when a knife is smeared with it and used for surgical operations, the largest vessels may be severed without any hemorrhage.

A scorpion was placed in confinement in a well ventilated tin can on the 26th of May, and lived without food till about the 29th of June.

[Written for the West American Scientist.]

ALGAE.

O, these delicate ocean gifts,
These children of the sea,
That sleep among the dash ng waves,
As beau iful and free.

When cast upon the sandy beach,
We gather them with care,
Admire their beauty and their grace,
And hidden glories rare.

But their own secrets long they kept,
Of Nature's wondrous ways;
Th ir fruit unknown 'till science came,
With microscopic gaze.

Algae, breath of the bounding sea,
Refreshment find we here,
To charm the heart and please the eye,
Enlarging beauty's sphere.

Nor blooms a spray on sea or land,
With glowing life and fair,
But gives a hint that we may trust
Its Author's loving care.

San Diego, California. E. E.

INDIAN ARROW POINTS OF OREGON.

Mr. H. C. Stevens, of Oregon City, Oregon, since 1878, has personally handled 35,000 fine arrow points, peculiar to Oregon, and fully 50,000 in all have been found by different persons. Before 1878 perhaps an equal number were found. Fully $3,000 have been realized on these in cash since 1878. At present few are found, except after a heavy freshet and overflow of the river banks, where the greater number have been found. These points at times represent the highest examples of savage stone c ipping, and are really so often gem materials that the demand for them as articles of jewelry is not surprising. The prices range from $1 to $2.50 each for the finer ones, which are usually made of rock crystal, flesh colored, red, yellow. brown or mottled jasper, obsidian, or various colors of chalcedony. They are principally sold in the east, scarcely any being sold in Oregon for jewelry. They are not made by the present Indians of Oregon.—[Geo. F. Kunz in 'Mineral resources of the United States.'

The editor of the 'Southern Geologist' haa been obliged to suspend its publica_ tion owing to other business requiring his whole attention.

OUR IGNORANCE OF MEXICO.

Although geographically near, and having been in commercial relations with the rest of the world for over three hundred and fifty years, there is probably less known to-day about Mexico than of almost any other country claiming to be civilized; certainly not as much as concerning Egypt, Palestine or the leading States of British India; and not any more than concerning the outlying provinces of Turkey, the states of Northern Africa, or the seaport districts of China and Japan. It is doubtful furthermore, if as large a proportion as one in a thousand of the fairly educated men of the United States or of Europe could at once, and without reference to an encyclopædia, locate and name the twenty-seven states or political divisions into which the Republic of Mexico is divided, or so many of its towns and cities as have a population in excess of fifteen or twenty thousand. The explanation of this is that, prior to the construction and opening of the Mexican 'Central' and Mexican 'National' railroads, or virtually prior to the year 1883, the exploration of Mexico—owing to the almost total absence of roads and of comfortable hospicia (inns) for man and beast, the utter insecurity for life and property, the intervention of vast sterile and waterless tracts, and the inhospitality and almost savagery of no small proportion of its people—was so difficult and dangerous that exploration has rarely been attempted; and those who have attempted it have greatly imperilled their lives, to say nothing of their health and property. Mexico, furthermore, is not fully known to the Mexicans themselves. Thus, a large part of the country on the Pacific coast has scarcely been penetrated outside of the roads or 'trails' which lead from the seaports to the interior. There are hundreds of square miles in Southern Mexico, especially in the states of Michoacan and Guerrero, and also in Sonora, that have never been explored; and whole tribes of Indians that have never been brought in contact with the white man, and repel all attempts at visitation or government supervision.—[Hon. David A. Wells, in Popular Science Monthly.

[For the West American Scientist.]

LANOLIN.

Apropos to your recent note upon the remarkable solubility of wool in alkaline solutions, it may interest some of your readers to learn that wool contains a most valuable fat also, which is now being saved and utilized for therapeutic purposes. It is composed of the ethers of fatty acids and is called "Lanolin."

Liebrich has shown that it is not merely a secretion from the sebaceous glands, but is a component part of all keratin tissues, such as hair, whalebone, feathers, etc. Ordinary wool contains about forty-five per cent. by weight of lanolin, while unwashed merino wool is said to yield sixty per cent.

As a menstruum, or base, for various ointments, it will be greatly appreciated by physicians and others, for the reason that never becoming rancid it does not irritate the skin; medicines are more readily absorbed when combined with it; and it can be supplied almost as cheaply as lard.

A READER.

DODDER IN CALIFORNIA.

MR. C. R. ORCUTT.

DEAR SIR:—Our secretary, Mr. Breckenfeld, hands me your letter inclosing that of Messrs. Vilmorin, Andrieux & Co., and asks me to answer: My paper before the Microscopical Society merely explains the microscopic features of the growth of the dodder parasite, as many of our members living in the city had never seen it. There was nothing in it which your distinguished correspondents do not already know. In remarks, I alluded briefly to the spread of the parasite in this state, where it has given considerable trouble to the growers of alfalfa (medicago sativa). It has appeared wherever the growth of this plant has been undertaken—though its appearance has been sporadic—never affecting all fields in any locality. No effective remedy has been discovered save that when only a few plants appear in a field they have been stamped out before seeding by piling straw on and around the spot and firing it. Whenever fields have been badly infested they have been plowed up and resown with clean seed. The result is there is very little complaint now heard of the parasite, and our people know it so well that they give it no chance to spread. I believe our California grown alfalfa seed is practically free from dodder seed, and though we have thousands of acres of alfalfa, one does not hear dodder mentioned once now where it was almost a constant subject ten years ago.

As to the occurrence of dodder in our Eastern states I can say that it is seldom heard of in the red clover regions with which I am acquainted. There was a time some years ago when the dodder of flax was a serious evil in Missouri, and the flax crop was nearly abandoned because of it, but the flax crop there is now large again. The connecting matter between these two facts I do not know.

Alfalfa is now one of our great crops in this state, and as I have said the dodder parasite is little heard of. The species of Cuscuta which grow here on salt marsh and on weeds and hillside shrubs do not seem to show any disposition to invade cultivated crops. Very respectfully,

E. J. WICKSON,

San Francisco, Calif., June 29, 1886. Editor "Pacific Rural Press."

AN INSECT MIMIC.

'Nature' has an article in which the author narrates his observations of an insect mimic. He was in Delhi and observed in the sunshine a dipterous insect, as he supposed, upon the wall. So much it resembled a common house fly feeding upon something stuck upon the wall that naturally flies would be led to the spot to share the food and become an easy prey to this really neuropterous insect of the genus Mantispa, which upon close inspection proved to have four legs instead of six like the fly, and what it appeared to be eating was simply a part of its own substance, its prothrorax being so curiously modified as to resemble a proboscis.

The Mantispa somewhat resembles the preying Mantis, though the two insects belong to different natural orders.

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THE

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The West American Scientist.

VOL. II. SEPTEMBER, 1886. No. 18.

[Read before the Society of Natural History August 6, 1886]

NOTES ON BIRDS INJURIOUS TO FRUIT.

The loss incurred by fruit-growers from the attack of birds upon their orchards is fast becoming an important topic; and one which must ultimately result in remedial measures, which should be judiciously enforced.

Every horticulturist ought to be versed in economic ornithology and entomology, in order to engage in a successful contest against the aggressors. An indiscriminate slaughter of birds and insects is harmful and unwise, because the beneficial share the fate of the injurious.

Fortunately there are very few species of birds that need to be checked in their voracity; and these should not be annihilated, but only reduced until their depredations cease to be felt. Every orchardist can well afford to donate some fruit to these sylvan songsters. Were they removed, how gloomy and silent would be the many places, which now are rendered delightful and joyous by the re-echoing strains of these many-tongued warblers.

I have often been asked the question: Do birds that destroy fruit feed upon insects? I answer: They do, as I've proved by observation and dissection.

The following nine species are those which are most destructive and the only ones worthy of being termed pernicious:

1. Curved-bill Thrush (Harporhynchus redivivus).
2. House Finch (Carpodacus frontalis).
3. Brown Towhee (Pipilo fuscus crissalis).
4. Black-headed Grosbeak (Zamelodia melanocephala).
5. Hooded Oriole (Icterus cucullatus).
6. Bullock's Oriole (Icterus bullocki).
7. Quail (Lophortyx californica).
8. Common Crow (Corvus frugivorus).
9. California Jay (Aphelocoma californica).

The Sickle-billed Thrasher is both frugivorous and insectivorous, attacking figs and grapes; is destructive to the garden ,pull-

ing up the young corn, melons and squashes; destroys mature corn in the same way that the California jay does—by stripping down the husks and eating the kernels. A specimen dissected June 7, 1885, contained 90 per cent of honey bees (Apis mellifica), a few seeds and one Silpha ramosa (This beetle is beneficial; I have watched them destroy the chrysalises of the cut-worm moth). This species is also very fond of worms and caterpillars. I have watched them catch aquatic larva. A resident species.

House Finch is not insectivorous, feeds entirely upon seeds, attacks the different varieties of fruit and feeds largely upon the seeds of the cruciferæ. Resident.

Brown Towhee is almost entirely granivorous; insects form a very small per cent. of its food and is very destructive in the orchard. Resident.

Black Headed Grosbeak feeds upon seeds and insects and is a most voracious bird in the orchard. This species destroys a great many destructive insects. A specimen dissected June 7, 1885, contained 12 spotted squash beetles (diabrotica soros) and nothing else. Migratory; arrives about March 26, and departs about September 30.

Orioles are insectivorous and frugivorous, committing great depredations in the orchard. If it were not for the accusation just mentioned these birds would be exceedingly useful, and as it is they are more beneficial in the devouring of noxious insects than any other birds. Migratory; arrives March 17, departs August 20.

Quail are exceedingly destructive in the vineyard. Resident.

The Crow is everywhere noted for its mischievousness.

The California Jay is like the crow in its harmful ravages; feeds upon the honey-bee and devours the eggs of other birds. Resident.

F. E. Blaisdell.

Poway, San Diego County, Cal.

[Written for the West American Scientist.]

THE VELELLA.

Among the many interesting forms of Medusae are two beautiful genera called Velella and Porpita. Velella has borne the name which designates its most striking peculiarity since the middle of the fifteenth century, on account, perhaps, of a somewhat fanciful likeness to a little sail. It is commonly called in Florida, where it is sometimes abundant, the 'float', and is likewise com-

monly confounded with the Physalis or Portuguese man-of-war. The body or disk of the Velella has an oblong shape, flattened upon its upper and lower sides.

A triangular sail rises on the upper side of the Velella disk and extends diagonally across its surface. It is firmly joined to the upper plate of the float. Over the triangular sail as well as the float, there is stretched a thin, blue-colored membrane, which is continued into a variegated soft rim along its border and around the rim of the float.

The Pacific Science Monthly, for June, 1886 gives the following note:

'The small jelly-fish, Velella limbosa, to which we referred some weeks since, continues to be cast upon our shore by the million. The beach is lined with this beautiful little medusae for miles. Why so many appear at this season is a mystery.'

Large numbers were washed up also on the ocean beaches at San Diego and Mr. Orcutt reports them in like abundance as far south as San Quentin bay, on the Lower California coast.

The violet snail, Ianthina, is said to feed on this jelly-fish, but I have not learned of their having been washed ashore in any numbers.

Can any one suggest a cause for the great abundance of this little animal on our coast during the months of April and May this year? S. L. T.

MONO LAKE.

Much interest was excited at a recent meeting of the San Francisco Microscopical Society, by the exhibition of some collections of animal and vegetable life found in and around Mono Lake, made by Dr. H. W. Harkness during his recent trip to that locality. Notable among them were specimens of the rare bacterium which has been provisionally classed as Bacterium rubescens, although Dr. Harkness believes there are strong grounds for regarding it as specifically new. It is found in immense quantities in Mono Lake, and aggregated masses of it are of a beautiful rose color. It seems to have both a still and a motile stage. No spore formation has been discovered in the preliminary examinations, but culture experiments are now being carried on which will no doubt disclose its complete life cycle. Numerous very active infusoria were found associated with the bacteria, and Dr. Harkness reports having found many species of diatoms, some aquatic insect larvae, minute crustaceans, and also fresh-water algae, in this remarkable lake, the water of which is so intensely alkaline that it

was formerly thought incapable of supporting either animal or vegetable life. An official analysis of the water of the 'Dead Sea of California', as it has been called, had just been received from Washington and is as follows:

Silica	0.28
Chloride of Potassium	2.23
Chloride of Sodium	18.22
Sulphate of Sodium	10.07
Borate of Sodium	.20
Carbonate of Sodium	19 49
Carbonate of Calcium	.68
Carbonate of Magnesium	.35
Water	948.47
Total	1,000.00

Thus showing the remarkable proportion of nearly 52 parts of solid constituents in each 1,000.

Specimens were also shown of the evaporated alkaline sediment from Owens Lake, stained a bright red by the presence of enormous numbers of the above-mentioned bacterium. Some further communications regarding the flora and fauna of the Mono Lake region have been promised the society by Dr. Harkness.

HYDRA, THE FRESH-WATER POLYPE.

Mr. A. H. Breckenfeld read a paper on Hydra, the Fresh-water Polype, July 28, before the San Francisco Microscopical Society. After referring to the original discovery of this remarkable little creature by that pioneer microscopist, Antony van Leeuwenhoek in 1703, allusion was made to the investigations of Trembley—by whom the animal was practically re-discovered nearly forty years later—and the great interest excited thereby among the naturalists of Europe. As to classification, Mr. Breckenfield said that the genus Hydra, Linn., ranks only a little above the protozoa. It is the lowest form of the great animal sub-kingdom Caelenterata (sac-animals), which is divided into two great classes, Hydrozoa and Actinozoa, and Hydra is the type of the former class, just as Actinia (the sea-anemone) is that of the latter. Hydra consists essentially of an elongated, nodular sac of protoplasmic substance, imbedded in which are found large numbers of colored granules. At the upper end of this sac, is a simple opening—the mouth—and just below this is a circle of tentacles, usually from six to ten in number. At the lower extremity the body is furnished with a flattened suctorial disk, by means of which the animal attaches itself to filaments of algae, rootlets of duckweed

and similar objects, while its slender, tendril-like tentacles are slowly and gracefully waving about in search of prey. The body and tentacles, when fully extended, seldom measure over one-fourth or one-half of an inch in length, except in the case of the rare species H. fusca, which sometimes attains a length of several inches, owing to the extraordinary development of the tentacles, which in that species are many times the length of the body. The tentatles of Hydra are hollow, each being traversed by a canal communicating directly with the body cavity. The body and tentacles are possessed of most remarkable extensile and contractile powers. At one moment the animal may be extended to such a degree that the tentacles are almost invisible by reason of their fineness, when upon being disturbed it immediately contracts until it appears like a minute, jelly-like lump, studded with a few stubby knobs. It then slowly expands until it is again fully extended. The little creature is extremely voracious. It subsists entirely on animal food, consisting mainly of minute worms and the smaller entomostraca. When the prey has been caught by means of the tentacles, these contract, and the unfortunate victim is forced with remarkable violence into the digestive cavity of the polype, the softer parts being there absorbed and the undigested portions ejected through the mouth. Of all the many marvelous properties possessed by this remarkable little organism, perhaps the most extraordinary is its power of reproducing lost parts. If the body be cut into numerous pieces, each developes into a perfect animal. If the tentacles be severed from the body, they soon obtain a new body, and the body from which they were cut produces a new set of tentacles. Innumerable experiments have been made, showing the almost incredible vitality of every part of this little animal. Some remarkable instances of abnormal development in Hydra were alluded to and a description given of two curious parasitic infusoria by which it was often infested. After referring to the wide geographical distribution of the animal and describing the species found in California, Mr. Breckenfeld concluded as follows: 'The little plant-animal, which we have been considering to-night, has been a celebrity in the scientific world for nearly a century and a half. Nor is this to be wondered at, for in the whole range of microscopic life there are few if any animals possessing equally attractive features to the investigator. Its graceful movements and interesting food habits, its comparatively simple structure, its plant-like appearance, its wonderful methods of reproduction and the important light which many facts in its histology have thrown upon the elucidation of structure in the higher animals—all invite attention and study.

Nowhere is more strongly illustrated the practically inexhaustible nature of microscopical research, for, notwithstanding the fact that Hydra has been the subject of continued observation since the days of Leeuwenhoek and Trembley, yet even its latest investigators, while adding to our knowledge, have also opened up a new series of questions calling for additional patient search, improved methods of study and increased optical facilities. We may rest assured, therefore, that although Hydra was one of the very first 'revelations of the microscope,' it will nevertheless be profitably studied as long as that magic lens has a single devotee.'

SEED VITALITY.

The limit of life in the embryo of seeds has long been a subject of experiment and discussion. In a late lecture, Prof. Bentley, an English botanist, stated that it is perfectly true that oats and other cerials have been raised from seed found in a mummy's coffin but it appears to be equally certain that the grains were placed in the ancient coffin by some means only a short time before the exhumation of the body. Not many seeds will germinate under ordinary circumstances after the third year, and very few indeed after the fourth. Peas and beans are very tenacious of life. The lotus has been known to grow after a hundred years, but there is scarcely another instance of such survival of vitality.

A NATURAL TRAP.

A curious form of animal trap exists in the Santa Paula valley, Ventura county, California, where many unfortunate creatures are captured by small streams of thick mineral oil which flow from the mountains during the summer down ravines which are watercourses in the wet season. Thus, it is stated on the authority of Prof. E. W, Hilgard, gophers, moles, squirrels, rabbits, all kinds of birds from the buzzard and hawk to the canary, as well as many kinds of insects, may be found just caught or completely submerged in the pitiless, viscid mass, which rarely releases a victim once touched. The frequent occurence of bones of lambs and calves proves that even larger animals are entrapped. It is supposed that the shining surface of the pitch gives the impression that the streams are water.

[Read by Miss Monks, before the Historical Society of Southern California.

TRAP-DOOR SPIDERS.

The underground life of Southern California is more remarkable than that of the East. The treeless and stoneless character of much of the country, drives many small animals to ingenious expedients to escape from enemies, and reduces them to makeshifts unknown to their more fortunate kindred.

Winged creatures are scarce. One looks in vain for the great variety of bees, butterflies, and birds that enliven the Eastern summer and make every wayside patch of flowers and thistle thicket a living panorama of color, motion and song. Here there are few homes and hiding places. Strong-pinioned hawks and buzzards can wing their way to distant forests; man-loving linnets are secure and happy in orchard and garden, but timid folk must seek homes on, or under the turf, or hide in far off canyons.

To a person used to the common fact that 'foxes have holes, and the birds of the air have nests,' there is a never-ending interest in squirrel burrows where gopher-snake and rattlesnake and owl and squirrel families blend together promiscuously.

Imagine the loneliness and homesickness and disgust of the first emigrant owl and his family, on these smooth foothills with no hollow tree or friendly stone wall near, when they found they must go down to the dark abode of the squirrel and be a companion of the snakes! Peace and concord and the sweet amenities of polite society may reign over these incongruous troglodytes, but no man knoweth, and the interested parties are becomingly reticent. Imagination alone can furnish another solution of the problem.

Other unfailing curiosities are the two large spiders, the Trap-door and the 'Tarantula', and the peculiar nests of the Trap-door spider.

So much confusion prevails about the two species and there are so many wonderful stories told about their instincts and ferocity, that it is perhaps worth while to collect all the authentic information possible on the subject. It is necessary to understand a little about the general structure of spiders to know how these differ from their relatives.

Spiders differ from insects, such as flies, beetles and butterflies, in having four instead of three pairs of legs, the head and chest blended together in one piece called cephalo-thorax; the large rounded abdomen without joints; the breathing organs as pouches and also air tubes, and the end of the body furnished with organs for spinning silk. The air pouches, called pulmon-

ary sacks, are little cavities containing leaf-like plates over which the blood flows and is oxygenized by air that enters through small openings on the outside, called stigmata. These sacks are on the underside of the abdomen. Not far from them are two tubes called trachea, which resemble the only breathing organs of insects, except that they are much shorter.

The principal nerve mass is in the lower part of the cephalothorax and has the stomach and heart above it. The six or eight eyes are on the top and front of the cephalo-thorax and are very good for seeing objects above the animal, but of no use for trifles under foot or at the side.

Spiders are armed with two strong, sharp curved and perforated fangs, connected with poison glands, and these fangs generally have a lateral motion. The mouth is eminently a sucking organ, provided with powerful muscles, and one use of the fangs is for holding the prey while the spider absorbs its life blood. They also have a short jointed appendage, like a leg, on each side the mouth, called maxillary palpus. The basal joints of these organs are modified into hard jaws which serve for crushing food, while the terminal joint has tactile function.

The Trap-door spider and the Tarantula belong to the same family—Mygalidae—and differ from other spiders in three important particulars. Their maxillary palpi are very long, so long that they look like a fifth pair of legs; their fangs move up and down, instead of having a side motion, and they have four instead of two pulmonary sacs. The sacs are the yellowish spots seen on the under side of the abdomen. The Mygalidae embraces the largest spiders.

The large bird-catching spider of South America is first cousin to what is called 'Tarantula' in California. Our species is not a tarantula at all, and does not even belong to the same family as the tarantula of south Europe.

Both our species are called tarantulas, and there is considerable popular confusion about the animals and their habits. They are easily told apart. The 'Tarantula' (Mygale Hentzii) is large —when extended it often covers the space of four or more inches; it is very hairy; black or dark brown in color, with sometimes an ashy tinge; and has long legs which indicate a wanderer.

The Trap-door spider (Cteniza California) is only half as large, is downy, pale brown, and has short legs. There is the greatest possible difference of opinion in regard to the tube building habit of the two species. I have never found a 'Tarantula' in a nest with a trap-door or a Trap-door spider in one with an open mouth. I have put Mygales of both sexes in jars of earth,

and they never would attempt to build tubes. They pull bits of earth together and spin a little silk, then stop—seemingly satisfied with the result of their labor. On the other hand, Ctenizas invariably go to work the first night and dig a tube and generally add the door the second night.

It is not uncommon to find a Mygale in a doorless tube, with the remains of a Cteniza scattered outside, which looks suspiciously as though the 'Tarantula' had dined off the mistress and taken possession of the house. Still the children here declare that 'Tarantulas' live in doored tubes. The children ought to know, for they are in the habit of subjecting the spiders to a species of water cure treatment. They pour water into the holes to drive them out, and then, taking advantage of the spiders' natural ferocity, set them to fighting.

The verticle action of the fangs helps to make a California spider's life worth living, for it gives a wide range of uses to these organs. In their sapper and miner operations the fangs are used as picks to loosen the bits of earth, then the bits of soil are folded against the chest by the fangs, and thus carried out to the mouth of the shaft. In making doors they are used to press the moist earth in position. When the spider comes home late at night, the fangs are used as a jimmy or night key to coax a door that is a little obstinate on its hinges. Like other spiders they use them for defending themselves, and for catching and killing their prey, and holding it while they dine; so that the formidable hooks that fold so neatly under the chest when not in use, serve as pickaxe, hod, trowel, jimmy, cimetar and fork in turn, at the pleasure of the owner.

Cteniza uses her fangs freely when disturbed. Upon slightest provocation she puts herself in fighting attitude, and quietly waits her opponent. In this position she throws back the cephalothorax, and supporting herself on three pairs of legs, lifts the other legs and the maxillary palpi high in air in a very threatening manner. As the enemy approaches, the fangs are suddenly raised and she throws herself forward and plunges the sharp hooks deeply into its body. I have seen drops of clear liquid poison hanging on the fangs of angry spiders, but from the record of others and my own observation, it would seem that it is far less deadly than is popularly supposed. There are many instances where people and lower animals have been bitten by Trap-door spiders, and have suffered no great inconvenience. I only know of one serious sickness resulting from a spider's bite, and that was in the East; and the spider, like most criminals, escaped without identification.

[TO BE CONTINUED.]

MOLLUSKS OF SAN DIEGO.—V.

The Calyptraeidae family contains the familiar cup-and- saucer and boat shells so common on every ocean beach. Our spiny cup-and-saucer limpet, Crucibulu m spinosum, grows abundantly on rocks and shells along our bay shores. The shell is irregularly round, conical, with a delicate internal cup-shaped lamina which is attached along a line on one side to the inner wall of the shell. The boat shells or crepidulas are similar limpet-like animals with an oval or oblong shell with a posterior, generally lateral spiral apex; interior of the shell with a shelly lamina covering its posterior half. Crepidula adunca grows to a length of an inch and a half and is frequently found in large numbers attached to the shell of Norrisia. It is easily distinguished from our other species by its prominent overhanging spire, and the delicate tinge of pink on beach-worn specimens. Crepidula rugosa is the more common species, growing in abundance on scallops and other shells and rocks. Crepidula navicelloides is a white elongated species found abundant in the interior of dead univalves, varying in size according to the shell occupied. Crepidula dorsata var. lingulata is easily distinguished from the preceding by its oval shape. It is abundant on rocks or shells, less than an inch in length, and very variable in form. The horse-shoe limpet, Hipponyx, has a thick, obliquely conical, non-spiral shell, with the apex somewhat posterior and curved backward. A shelly base is secreted by the foot of the animal. Hipponyx tumens and H. antiquatus var. serratus are the two kinds known at San Diego.

The beautiful wentle-traps or stair-case shells belong to the family Scalaridae, and are mostly pure white and lustrous. They are many whorled, turreted, and ornamented with numerous transverse ribs. There are 150, mostly tropical, species of Scalaria, many of them very rare and beautiful. Single shells of Scalaria pretiosa have sold as high as $500. Scalaria indianorum is the more common species on this coast. I have also found Scalaria bellastriata, S. hindsii, and S. hindsii var. subcoronata at San Diego, clinging to alga-covered rocks on our ocean beaches, or washed up on the sand. Other species are likely to be discovered as there are eight kinds known on the coast. Opalia crenatoides is a shorter, stouter shell, easily distinguished from the scalarias.

The beautiful and fragile violet-snail, Ianthina bifida, is frequently washed ashore along the coast. The Ianthina, or oceanic snails, are gregarious in the open sea, where they are found in myriads, and are said to feed on the small blue acalephae, Velella. When handled they exude a violet fluid from beneath the margin of the mantle.

The Caecidae are seemingly gregarious mollusks, that congregate in immense numbers at certain seasons at least. The shell is tubular, regular, minute. The following from the Proc. U. S. Nat'l Museum for 1885, p. 541, by Dr. Dall, gives an account of the only species known to me:

Caecum californicum, Dall.

Caecum Cooperi, Cpr. Suppl. Rep. Br. As. 1864, p. 655, not

Caecum Cooperi, Smith, Ann. Lyc. Nat. Hist. N. Y., pp. 154, 168. 1862.

San Diego. Cooper.

The above synonymy shows that the two species named C. Cooperi, that of Mr. Sanderson Smith has priority, and consequently the Californian species is the one which must take a new name instead of the New York form. Through a failure to observe this, Dr. Cooper fell into the error of renaming C. Cooperi (New York) as C. Smithii (Proc. Phil. Acad. Nat. Sci. 1872, p. 154).

Caecum orcutti, Dall, n. s.

Shell small, stout, smooth, but not polished, light warm brown in color and without sculpture, except very slight lines of growth. Shell slightly curved, the anterior aperture very oblique, about at right angles to the plane of the diameter of the plug, the superior margin being the anterior; plug glandiform, smooth, rounded without mucro; operculum brown, thin, smooth. Lon. of shell, 2.00; diameter 0.75mm.

San Diego, Orcutt, abundant under stones.

This is the smallest and the only smooth Californian species of the genus. [Dall.

We now come to a family of mostly minute shells, the Turbonillidae. The shells are white, slender, elongated, many-whorled, and mostly longitudinally ribbed or spirally striate. The odostomias and turbonillas, of this family, are usually found on the backs of abalone shells, in crevices of rocks, or in similar situations. Pyramidellidae is a closely related family, containing Obeliscus variegatus, a very rare, smooth shell, an inch long or less, which resembles in general appearance the commoner Myurella simplex. It differs from Myurella, however, by the presence of a prominent tooth on the columella. I have found only a few water-worn shells of this interesting species at San Diego.

The Litorinidae inhabit the sea, brakish or fresh-water, some being amphibious. They are mostly littoral, feeding on algae. The periwinkles or litorinas, which belong to this family, are found on the sea-shore in all parts of the world. The shell of litorina is turbinated, thick pointed, and few-whorled. Litorina planaxis is the more common kind at San Diego and is more globular, larger and stouter than our other species, L. scutulata, which latter is darker in color and less variable in its markings. The lacunas have thin turbinated shells and our species are quite small. In the spring they are often found abundant on sea grass or elsewhere near the shore. Lacuna variegata and L. unifasciata are the two species known to me at San Diego, and differ but slightly from each other.

[Correspondence]

A QUERY.

Are horned toads harmless? I have always supposed so, but a well known and prominent physician informs me that the fetid breath of a horned toad, if inhaled, is very poisonous, and if medical aid is not speedily obtained, may prove fatal. Will some one who knows by actual observation, answer the above query through the columns of the WEST AMERICAN SCIENTIST. G.

ECONOMIC LAWS AND METHODS.

'If asked to define political economy, I should say that political economy treats of industrial society. Its purpose as an analytic science is to explain the industrial actions of men. Its purpose as a constructive science is to discover a scientific and rational basis for the formation and government of industrial society. But, it may be asked, under what conditions can political economy be said to have attained its scientific purpose? When is an industrial fact satisfactorily explained? I answer, when it is referred to some general truth which, either for the sake of convenience or because our limited intelligence will not permit us to press the inquiry further, must be regarded as final. Truths of this sort are fundamental in economics, and are capable of being classified under heads. (a) The first class embraces what is ordinarily called the laws of human nature. Such truths are discovered by a study of one's self, by a study of history, and by a study of statistics. * * * * * * * (b) The truths of physical nature to which all industrial activity must conform are likewise final for purposes of explanation. * * * * * * * (c) The third class of final truths is disclosed when once the explanation of observed facts is traceable to the legal structure of society. * * * * * *

'Because certain things are true in physical science, it does not follow that similar things are true in social science. One may be well versed in the methods of successful investigation in the physical sciences, and yet not possess the mental equipment necessary to arrive at truth through the intricacies of social relations. And why? For two reasons. In the one case the forces considered are permanent and reliable, in the other, some of the forces are subject to constant variation. Development of a physical science consists in the discovery of truths which are assumed always to have existed, nor has such an assumption so far in our experience proved the source of error. Development of a social science, on the other hand, consists partly in the new discovery of old truths, and partly in observing new truths to emerge from the growth of the social organism. * * * The study of physical science is not complicated by the fact that the forces considered have a conscious purpose and within limits, are self-directing. But in social sciences this is not the case, at least the theory of social science with which the latest phase of economic science allies itself holds strenuously to the idea of a self-conditioning social organism. * * 'There is no such sharp line of distinction between the science and the art of economics as has been commonly supposed. * It is preferable to speak of a science of economics which is at the same time analytic and constructive. * * 'Economy is not an independent study; it is a dependent subordinate study, which first finds its true place when framed into study of society as a whole. There is no such thing as a scientific treatment of one function of a developing organism which does not recognize the essential and permanent relations of that function to other forms of activity by the same organism. Nor are all economic truths 'authoritaative and rigid'. Most of them are dependent and relative'.

[Henry C. Adams, in SCIENCE. July 30.]

I—Proceedings.

San Diego Society of Natural History.

August 6, 1886. The monthly meeting was held at the rooms on Sixth street, Mrs. Z. R. Cronyn, presiding in the absence of the president. The committee on the society seal reported that one had been procured. Hosmer P. McKoon and Mrs. Matilda G. Bancroft were elected active members, and Mr. and Mrs. E. W. Morse were elected life-members by a unanimous vote. An extensive correspondence and numerous donations to the library and museum were reported. On motion of Mr. Joseph Surr, the thanks of the society were extended to Mrs. E. W. Morse, for the donation of a lot. Mr. F. E. Blaisdell read a paper, 'Notes on birds injurious to fruits'.

San Francisco Microscopical Society.

June 9, 1886. The regular semi-monthly meeting was held at No. 120 Sutter street, E. J. Wickson presiding. A slide of the 'brine shrimp', Artemia salina, was shown under dark field illumination. Attention was called to the head of a male wasp, mounted by Fred Enock. A collection of fruit pests, mainly insects belonging to the aphis and coccus families, and their natural insect foes was exhibited by Dr. Bates, who narrated some interesting facts regarding the same, followed by remarks by Mr. Wickson.

June 23. E. H. Griffith was elected a corresponding member. Specimens were exhibited by Drs. Stallard and Harkness and Messrs. Howard, Wickson and Clark. Donations were made by Dr. C. P. Bates and Mr. King.

July 14. A lecture was given by Dr. Arning, before the society..

July 28. A paper on 'Hydra the fresh-water polype,' was read by A. H. Breckenfeld.

[Written for the West American Scientist.]

JOTTINGS BY THE WAYSIDE IN SOUTH CALIFORNIA.

At five o'clock in the evening I left San Diego, on the steamer, for San Pedro. As we sailed around the point, the scenery was magnificent. With pleasant company I watched the sun sink slowly into the ocean; while city, bay and peninsula seemed to be receding in the east. Reached San Pedro early in the morning and were landed on shore in a little tug provided for the purpose. There being nothing worthy of note at San Pedro, I proceeded at once to Los Angeles, (city of angels). A thriving city, said to rank third in the state, surrounded on all sides by rich farming land, and containing about fifty thousand inhabitants. Los Angeles is a beautiful place, and has many fine residences and public buildings.

The schools and colleges found here are worthy of mention, and show what eastern enterprise and intelligence is doing for South California. I found many periodicals and three ably edited daily papers here, all doing well. Long Beach is the favored sea-side resort for this section. Its long sandy shore and shallow water make it a delightful place for bathers. The numerous tents around would remind

one of a military encampment. While there I had the pleasure of hearing an interesting lecture on the scenery in the British Isles, delivered before the Chautauqua literary and scientific circle, by Dr. Wythe, of Oakland.

Pasadena is one of the beautiful places of South California. Every place is a fruit and flower garden, while the surrounding mountains add beauty to the scene. I was hospitably entertained by Mr. H. N. Rust, owner of an extensive nursery in South Pasadena, and well known as the manager of the California citrus fair, lately held in Chicago. He has a fine collection of minerals and Indian relics of pre-historic times, well worth going some ways to see. Pasadena and Alhambra are temperance towns. This speaks well for their future prosperity. At Alhambra they are building a new school house costing $8,000, which will add much beauty to the place. Colton is a railroad center, and though very new is fast growing in importance.

San Bernardino is an old town for South California. The town was first settled by Mormons from Utah, and there are many of the old settlers who still adhere to that religion. The 'Index' will show that the 'Morning Hour' is pleasant and 'Times' good in this place. San Bernardino is a lively business place and contains about seven thousand inhabitants.

Riverside is the banner town for orange culture. The houses are half concealed among flowers and shrubbery, and there are evidences of wealth and refinement on every side. A few years ago this place was a sheep ranch. Now there are to be found the finest orange trees in the state, many of them yielding their owners from six to ten dollars each annually. This must be an enterprising town, for in passing down one of the main streets I saw a banner over my head bearing the motto 'The Daily Enterprise'. They have a 'Horticultural Press' and 'Valley Echo' here also. There are no saloons, which shows that it is a temperance community.

Having lately come to California I see much to attract the eye in this semi-tropical country. Yet it has its disadvantages. One must make allowances, for there are many obstacles to overcome, and much work to be done before the whole of South California will 'blossom like the rose,' or be 'a land flowing with milk and hone.'

A TRAVELLER.

SINGING SANDS.

Everybody has heard of the singing beach at Manchester, Mass., the sands of which for a distance of about a fifth of a mile, gives out a sound when walked upon, or even when stirred by a stick; but it is not so generally known that in 1884 inquiry among the superintendents of the life-saving service showed that samples of singing sand could be found in twenty-six different places on our coast. It is said that later investigation has increased the number to seventy-four in America and thirteen abroad. At Manchester, an experiment showed that the sound evoked by the sand by driving a stick into it, could be heard at a distance of 140 feet, over the roar of the surf. Professor Botton, of Trinity college, and Julien, of Columbia, have been making a study of the subject, and their conclusions are here

given: The singing sand may occur in comparatively small patches in the midst of ordinary sand. It always occurs between the limits of high and low tide. The same sand does not produce sounds at all seasons, nor does it always give forth like sounds. When wet it does not emit sounds. Samples, when transported in bags lost their sonorousness, but retained it when sent in bottles.' The leading theory is that the sound is produced by friction between the angular particles, and the conditions are believed by Professor Julien to be perfect dryness, uniformity of grain, varying from one-fifth to one-tenth of an inch in diameter, and freedom from dust. BUFFALO COURIER.

SCIENTIFIC SOCIETIES OF CALIFORNIA.

I—DIRECTORY.

California Academy of Sciences, San Francisco: Geo. Davidson, Pres.; S. B. Christy, Cor. Sec..

California State Geological Society, San Francisco: Henry G. Hanks, Pres.; S. Heydenfeldt, jr., Sec..

Geographical Society of the Pacific, San Francisco.

Natural History Society; San Francisco: Wm. H. Barrows, Pres.; Wm. C. Flint, Cor. Sec..

San Diego Society of Natural History: George W. Barnes, Pres.; Miss Rosa Smith, Cor. Sec..

San Diego Lyceum of Natural Sciences: R. J. Gregg, Pres.; George N. Hitchcock, Cor. Sec..

San Francisco Microscopical Society, (P. O. box 1327): C. M. Kinne, Pres.; C. W. Banks, Cor. Sec..

Santa Barbara Society of Natural History: H. C. Ford, Pres.; Mrs. R. F. Bingham, Cor. Sec..

Humboldt Society of Natural History, Arcata, Humboldt county: Carl C. Marshall, Sec..

Historical Society of Southern California, Los Angeles: Isaac Kinley, Pres.; J. C. Oliver, Sec..

Ventura Society of Natural History, San Buenaventura: Stephen Bowers, Pres.; J. S. Collins, Sec..

Southern California Museum Society, Los Angeles: Prof. J. H. Von Keith, Pres. and Sec..

California State Mining Bureau, San Francisco: Wm. Ireland, jr., State Mineralogist.

Valuable publications have been received from Dr. C. A White, Dr. Asa Gray, Harry A. Hilsbry, Dr. C. C. Parry, H. N. Rust, John W. Phillips, A. A. Crozier, Henry B. Baker, Historical Society of Southern California, Massachusetts horticultural society, Wisconsin academy of sciences, arts and letters.

EDITORIAL.

Numbers one and two of this journal are wanted; ten cents each will be paid for them.

We acknowledge an invitation to the sanitary convention to be held at Big Rapids; Mich., under the auspices of the state board of health, November 18 and 19, 1886. The objects of the convention are the presentation of facts, and the discussion of methods relating to the prevention of sickness and deaths and the improvements of the conditions of living.

Well! Orders for a few thousand plants, and quantities of seeds, rendered it necessary for the editor to visit the mountain and desert regions of this county. What with the large correspondence requiring prompt attention, and other matters of importance, little time has been found for scientific studies or editorial labors. As we were already behind time with the SCIENTIST, it was considered best to omit an August issue that we might catch up with the work. As the editor has become relieved of the business management of the journal, more time can be devoted to it in the future, and we trust that it will not again be necessary to skip any month. Subscribers will receive twelve numbers for a year's subscription and no number will count more than one.

Mr. John B. Hyde, of San Telmo, Lower California, a son of the well known Judge Hyde of San Francisco, is authority for the account given in this journal (ii, p 49) of road-runners corralling rattlesnakes. He gave the full particulars to Mr. Ira J. Gray and the editor, informing them that he was one of the eye-witnesses to the whole remarkable performance of the bird. Capt. S. Haley, of Los Angeles, says he has also personally observed the trail-runners (as they are better known to old Californians) to destroy rattlesnakes in a similar manner, building the corral however while the reptile was asleep. Any others who may have been so fortunate as to observe this curious performance of the road-runner are invited to give their experience.

We are pleased to note, that, with the rapid development of South California and the consequent increase in wealth and population, that science keeps a steady pace as well. The society of natural history at this place is showing promising signs of life and has been placed upon a much more permanent footing with the institutions of the city by the donation to them of a valuable lot. As another indication of the advance of science, we are proud to record here the fact of our subscription list having more than doubled in the last few months. Probably no journal has met with a more favorable reception than the WEST AMERICAN SCIENTIST among an intelligent class, both at home and abroad,—in fact wherever the paper is known. Learned societies of Europe and America and numerous and prominent journals send us invitations to exchange—a sure index to the reputation it is gaining—and new subscriptions continue to come from different parts of the country. They are all welcome, and contributions to our pages from any quarter will be also.

EMINENT NATURALISTS. I.

By Prof. Josiah Keep.

The name of a species is very closely connected with that of its discoverer, or at least, with that of the one who first gave it a name and published the same to the scientific world.

His own name or initials are henceforth universally appended to the name of the species, and while this is done primarily to prevent mistakes, and to show whose original description is to be relied upon as authentic, still these initials carry with them to the thoughtful naturalist, many interesting memories and inspiring suggestions.

The name no longer simply designates a particular species, beautiful and interesting though that species may be. It has a human element as well, and comes close to the life and heart of the student.

It may tell of struggles and privations in the pursuit of knowledge; it may speak of indefatigable labors and boundless courage; it may come as a note of warning against disobeying the laws of life, even in the desire to accomplish great things for science; it may provoke a laugh, as the oddities of its owner are recalled; or, best of all, it may cause the heart to glow with a new feeling of manliness, as one recollects the nobility and pure devotion of some revered teacher and writer.

The study of nature is an ennobling occupation when viewed from either of three stand points. First: The objects of nature are pure and beautiful themselves. Second: They point us to the Creator, and manifest forth his goodness, wisdom and power. Third: They refer us to men who have lived and labored and searched and studied; noble men, men of rich lives and exemplary character, men whom we would do well to know and think about, and whose virtuous and manly lives we might well strive to imitate.

In order to feel an interest in a person we must first know something about him, and to promote an interest in eminent naturalists it is proposed to briefly present a few facts concerning some of the men whose initials are appended to the names of many of our species, particularly of the mollusks of our Pacific Coast. The writer makes no claims to originality, but simply for reaching out and bringing together the facts from any available source. Let us begin with

THOMAS SAY.

There are two names connected with the rise and fall of Natural History in the United States, both of whose owners exercised an influence in its promotion, but with far different results in usefulness to science and in honor to themselves. The first name is that of Thos. Say, a name to be held in profound respect by every American naturalist.

Mr. Say, a native of Philadelphia, born in 1787, seems to have been the earliest scientific naturalist of the modern school which the country has produced.

He possessed a well balanced mind, powers of accurate observation, and a facility of expressing his thoughts in a brief and condensed style. He was trained to habits of industry and perseverance, and his manners were so modest and retiring as to excite remark.

His acquirements as a naturalist were due to his private studies alone, for at the period when his character was forming there were but few or none engeged in kinlred pursuits, and few libraries to which he could resort for knowledge and assistance. But notwithstanding the deficiency of his means and opportunities, he possessed himself of the learning and accomplishments of the day in a much greater degree than could have been expected in his position, and on the termination of the European wars he was ready to make that advance in the branch of knowledge to which he had devoted himself, which has associated his name with the history of zoology in the United States, and which ought to entitle him to the honor of being styled its founder.

His published works extended through a period of eighteen years, until his death in 1834, and embrace descriptions of a vast number of animals until then unknown, or but imperfectly understood. The invertebrate classes received the greater part of his attention, and his contributions to their history form an important portion of the means of any writer who seeks now more fully to elucidate them. His descriptions were mostly clear and accurate, and his species have stood the test of criticism.

At that early period the shells of California were not well known, and hence we find Mr. Say's name occurring but seldom in our lists. It is found chiefly in connection with certain forms of fresh water shells, as Physa heterostropha, Say, a little sinistral water-snail, which lives also in Eastern brooks. But our exchanges bring his name often to our notice, and we are glad to know and respect so great an early American naturalist.

RESPONSE TO 'THE MORNING AIR.'

Dear friend afar, 'The Morning Air,'
Electrifies my heart,
And all my pulses thrill with joy
To have in it a part.

May ocean breezes fan you still
And every joy be thine,
And truest friendship find a place,
Round that sweet home to twine.

Though all the charms that nature holds,
In brightest robes arrayed,
Round thee cluster, forget me not—
Of this I'm not afraid.

Long may the 'Scientist' endure
To edify the land,
And tell the name of every flower
That blooms upon the strand.

New York City, August 19. J. L. F.

NOTES AND NEWS.

No. 17 of this journal was issued on the 29th of July.

Centipedes near Silver Springs mines in Arizona, are reported to be a foot long.

Prof. Rogers is delivering a course of popular science lectures in connection with his scientific and literary instruction in this city.

Mr. John Spence, of Santa Barbara, has found Cystopteris fragilis—the delicate bladder fern—in that county, at an elevation of over 6,000 feet under rocks.

More than 33,000 tons of naphtha is estimated to be floating down the Volga from vessels destroyed by ice in the spring. Great injuries to the fisheries is expected to result.

In Germany there are now eight schools of forestry, where a training of five years is necessary for students seeking government positions. France supports a single school at Nancy.

The River Euphrates is reported to be gradually disappearing in the spreading marshes just below Babylon, which have ruined the steamboat channel and are now obliterating navigation for row boats.

The society of natural history has secured a building site in an eligible location,—thanks to Mr. and Mrs. E. W. Morse, who have been intimately associated with the society since its organization.

Mr. Ira J. Gray, recently from the Green Mountain state, has accepted the position of business manager of this journal. This will enable the editor to devote more time to his department, and beneficial results financially are looked for.

Astronomical photography continues to meet with great favor in France. Since the successful trials of the special photographing telescope at the Paris Observatory, French astronomers have decided to build three other instruments of the kind.

Rev. E. L. Greene, who is botanizing on Santa Cruz Island, reports very gratifying success in his explorations on this, the one large island on our coast, which remained botanically unexplored. He has found no less than 306 species, some 25 of which he expects are new.

The San Diego Medical Society was organized August 6, with Dr. R. J. Gregg, president and H. T. Risdon, M. D., secretary. The annual meetings are to be held on the first Thursday in August of each year. The monthly meetings are to be held on the first Thursday of each month.

Singularly flattering reports continue to be made concerning Dr. Domingos Freire's system of preventive inoculation in yellow fever. A late one to the Paris Bilogical Society states that during the three hot months in Brazil ending with February last, 3051 subjects were inoculated in Rio de Janeiro and not one had the fever, whereas in the same districts and houses 278 non-vaccinated succumbed to the disease. What is more remarkable is that severe cases were inoculated in the second stage of the disease, and all recovered.

During recent years, great loss to farmers of Norway has resulted from a disease affecting the roots of barley. This proves to be due to a microscopic round worm, Tylenchus hordei, which also attacks the roots of the bind-grass of the Norwegian and Scotch coasts. A remedy has still to be sought.

The quantity of coloring matter which must be mixed with a perfectly white powder—such as carbonate of magnesia—before the human eye can detect it, has lately been the subject of some interesting experiments, from which it appears that red and yellow are most easily detected, sixteen and seventeen parts respectively being sufficient to perceptibly tinge 100,000,000 parts of white.

A new method of lighting, called the pneumatic system, has been described by a Frenchman, M. Bender. He employs the fatty residues obtained from the rectification of crude mineral oils, through which he passes a current of air. The air takes up a definite quantity of this hydro-carbon, and the flame produced is very brilliant, giving off no smoke. Cheapness and immunity from explosions are advantages claimed.

It has been an extensive belief in France that the drinking of water in considerable quantities has a tendency to reduce obesity, by increasing the activity of oxidizations in the system and favoring the burning away of accumulated fat. The error of this idea has just been shown by Dr. Debove who has proven that the quantity of water taken has no influence on nutrition or body weight so long as the solid diet remains unchanged.

The lowest temperature at which the seeds of common cultivated plants germinate has been determined by Mons. Hellriegel. Barley and oats were found to start in soil having a temperature of 35 degrees; ryes and wheat, at 32 degrees; Indian corn, at 48 degrees; the turnip, at 32 degrees; flax, at 32 degrees; the pea and clover, at 35 degrees; the bean and lupin, at 38 degrees; asparagus, at 35 degrees; the carrot, at 38 degrees and the beet at 40 degrees.

Prof. Germain See, the eminent French physiologist, declares that man is omnivorous, and is destined to live on the elements furnished by the three kingdoms of nature. He cannot maintain robust health on meat alone as food, nor can he live on vegetables alone. The practice of pure vegetarianism is simply impossible, and the so-called vegetarians are compelled to make up the deficiency in their food by consuming a quantity of such animal substances as milk, eggs and butter. From the mineral kingdom must be had pure water, which can be replaced by no other fluid.

As the result of an experimental inquiry, Dr. Sandras, a physician of Paris, claims to be able to change the nature, intensity, pitch and extent of the voice in a surprising degree by the use of different inhalations. A few inspirations of alcoholic vapor imparts a decided hoarseness, some vapors weaken the voice while others strengthen it to such an extent that it acquires new notes, high and low. If the same effects are produced upon people generally, this curious discovery must prove of great practical value to public speakers, singers, and all who use the voice considerably.

In Sweden wood oil is now made on an extensive scale from stumps, roots and the refuse of timber cuttings. In special lamps it gives a very satisfactory light, and is the cheapest of all illuminating oils.

A boring made by the Prussian Government at Schladeback in search of coal is said to be the deepest in the world. Its depth is 4560 feet, its breadth at the bottom two inches, and at the top eleven inches. The temperature at the bottom is 118 degrees.

A new species of box-wood from South Africa has just been described by Sir Joseph Hooker under the botanical name of Buxus Macowani. As it is in considerable quantities and suitable for engravers uses it may prove a valuable addition to the diminishing supplies of European box-wood. When seasoned without cracking the wood is valued at two cents per cubic inch.

The occurrence of poisonous mussles and star fishes in a German locality has led to an investigation from which it appears that simple stagnation of sea-water is capable of giving rise to poisonous qualities in the animals inhabiting it; and that, too, when it is free from sewage and other impurities. The poison in the mussels has been described as a ptomaine under the name of mytilotoxin; but Prof. Virchow says it cannot be a true ptomaine, as it is not a product of decomposition. It must result from the conditions of the mollusk's growth.

A safety cartridge of a novel kind has been introduced by Dr. Kosmann of Breslau, for use in coal-mines. A glass tube having two divisions contains finely divided metallic zinc in one part and sulphuric acid in the other. The cartridge is introduced and the hole bored to receive it is firmly closed, when the tube is broken by means of an iron rod. The sulphuric acid is thus brought into contact with the zinc, and the rapid evolution of hydrogen gas which follows exerts a pressure on the sides of the hole estimated at 37,000 atmospheres and rends the rock.

In a recent geological paper, Prof. J. Starkie Gardner sketched the value and importance of the grasses at the present day, remarking that they occupy under cultivation one-third of the entire area of Europe, inclusive of lakes and mountains, while exclusive of malt and spirituous drinks distilled from them, their products to the value of nearly one hundred millions sterling are imported annually into England alone. There are over 3,000 species fitted to occupy most diverse stations and to overcome nearly every kind of vegetable competition, with the result that about ninety-five per cent. of the plants growing in meadow lands are grasses.

The recent French surveys have shown that the magnitude of the Algerian sea project has been greatly exaggerated. No large part of Northern Africa can be flooded, the Detert of Sahara proving to have an average height of 1100 feet, and the only area below sea level being comprised in two 'choots' commencing about 100 miles due west of the Gulf of Gabes and covering only about 3100 square miles —less than half the area of Lake Ontario. The flooding of the depressed region would give a lake averaging 78 feet in depth. The creation of a new sea of such size could hardly produce the great effects upon the world's climates and upon the depth of the ocean which have been foreseen in the speculations of some scientific writers.

DESCRIPTIVE PRICE-LIST.

California Lilies.

Humboldt Tiger Lily, Lilium Humboldtii: Large and stout; flowers orange colored, spotted with brown. Thrives in dry open places. Each, ... 50

Lilium Columbianum: A graceful miniature of the last, ... 25

Washington Lily, Lilium Washingtonianum: Tall and stout with whorls of dark green leaves and many pure white, very fragrant, flowers, ... 75

Lilium rubescens: A rare form resembling the Washington Lily, the flowers changing from white to dark ruby-red after opening, ... 2 00

Marine Lily, Lilium maritimum: Small, with dark foliage, and 2 to 20 deep crimson flowers dotted with black, ... 1 00

Lilium parvum: Slender, graceful, with 2 to 50 bell-shaped flowers with light yellow centers dotted with brown, the upper half of petals scarlet, ... 50

Lilium pardalinum: Flowers large, with yellow center, tips of petals light scarlet blotched with brown, ... 30

Variety puberulum: Flowers with light orange center, ... 30

Variety Californicum; upper two-thirds of petals scarlet, ... 50

Parry's Lily, Lilium Parryi: Flowers lemon yellow, large and very fragrant. Very fine and rare. Expected 3 00

Hookera or Brodiaea.

Hookera, better known under the old name, Brodiaea, is a genus of beautiful plants, peculiar to California and the adjacent region and flowering in midsummer, producing clusters of bright glossy blossoms,—generally of long duration.

Hookera grandiflora: Flowers large, purple. Each, ... $0 10

Hookera minor: Slenderer than the last. 15

Hookera terrestris: Tall, with numerous flowers, forming a star-like purple cluster, often 15 to 30 flowers to a single bulb, ... 20

Hookera congesta: Slender, with clusters of showy purple flowers 10

Hookera capitata: Similar to the last, ... 05

Variety alba: Flowers pearly-white. Rare, ... 25

Hookera laxa: Produces a loose-spreading umbel of showy blue flowers on a slender erect scape, ... 10

Hookera lactea: Petals banded with green, 10

Variety liliacina: Petals tinged with white, ... 20

Hookera Howellii: A little known form, 15

Hookera gracilis: Small, flowers yellow, 20

Hookera ixioides: Resembles the last, ... 10

Hookera stellaris: The purple flowers with a pure white center, ... 25

Hookera Orcuttii: A new form not yet in stock, ... 25

Mariposa ('Butterfly') Tulips.

The Calochortuses, excepting the true lilies, are the finest of the beautiful bulbous plants peculiar to the Pacific Coast. The long glossy leaf, and the either short and weak, or tall and strongly erect flower stem, bearing few to many handsomely formed and brilliantly-colored flowers, render it very desirable.

Calochortus albus: Flower large, bell-shaped, pearly-white. Each, ... 25

Variety paniculata: A dwarf form, ... 10

Calochortus pulchellus: Low and slender; flowers nodding lilac-white, ... 15

Calochortus Benthami: Flowers light-yellow, often bell-shaped, ... 25

Calochortus Maweanus: Resembles C. elegans closely, ... 15

Calochortus caeruleus: Resembles C. elegans closely 15

Calochortus elegans: Celestial star-tulip; flowers nodding, lilac-white, densely lined with silky white hairs, ... 15

Calochortus Tolmiei: Flowers pure lilac, 20

Calochortus nudus: Flowers lilac color, 25

Calochortus lilacinus: Flowers lilac, very pretty, ... 10

Calochortus Weedii: Deep yellow, with a dark brown spot on each petal. A rich colored species, ... 50

Calochortus Kennedyi: Petals of a clear reddish orange. Very fine and showy. Not in stock, ... 1 00

Fritillarias.

Crimson Fritillaria, F. recurva: Flowers brilliant crimson; scape 8 inches to 2 feet high. These plants are related to the Crown Imperial. Each, ... 25

'Black Lily', F. biflora: Flowers very dark, nearly black, ... 25

Fritillaria liliacea: Flowers white. 15

Lanceolate Fritillaria, F. lanceolata: Flowers greenish yellow, curiously mottled, 15

Fritillaria atropurpurea: Dull purple, nodding, bell-shaped flowers, ... 25
Fritillaria pudica: Low, with white flowers 20

Miscellaneous Bulbs.

Yellow Dogstooth Violet, Erythonium grandiflorum var. albiflorum; Flowers large, light yellow; leaves beautifully mottled. Each, ... 15
Purple Dogstooth Violet, E. purpureum: Nodding, bell-shaped, purple flowers, ... 25
Camass, Camassia esculenta: Flowers dark blue to nearly white, ... 10
Camassia Leichtlini: Similar, with light blue fls., ... 25
Brevoortia coccinea: Petals crimson, tipped with pea-green. Very fine, ... 25
Allium serratum: Very dark rose-color, 10
Allium unifolium: White to rose-color.. 10
Allium haematochiton: A fine species,.. 10
Allium fimbriatum, ... 15
Allium acuminatum, ... 25
Allium Sanbornii, ... 25
Allium falcifolium, ... 25
Muilla maritima: Small, greenish-white fls, ... 10
Bloomeria, B. aurea: A fine plant with large umbels of golden yellow fls..... 20
Cleveland's Bloomeria, B. Clevelandi: A new form, only a few inches high, with smaller flowers than the golden Bloomeria. Discovered in 1884, ... 25
Calochortus Nuttallii: Petals white above tinged with greenish yellow or lilac and with a purple spot or band above the yellow base, ... 25
Calochortus Gunnisoni: A splendid tall form with lilac flowers marked with purple lines and bands, ... 30

Southern California Ferns.

California Polypody, Polypodium Californicum. Each, ... 10
Gold Fern, Gymnogramme triangularis,.. 10
Silver Fern, variety viscosa of the last,.... 10
Cotton Fern, Notholaena Newberryi,..... 25
Lace Fern, Cheilanthes Californica,..... 25
Cleveland's Lip Fern, Cheilanthes Clevelandi,. 50
Pellaea Ornithopus: Tea or wire fern,... 15
Adiantum emarginatum. Veneus-hair fern, 25
Feather Fern, Asplenium Trichomanes var. incisum. A rare and lovely species, 50
Woodwardia radicans. Immense fronds, 3 to 8 feet tall!..... 1 00
Chlorogalum pomeridianum: Soap plant tall, bearing hundreds of pearly-white blossoms, ... 30
Chlorogalum angustifolium, ... 30
Zygadenus Freemontii: Flowers in fine spikes 3 inches to 4 feet high, creamy-white. California water-lily, ... 15
Calochortus luteus: Clear lemon-yellow, darker at base, ... 10
Variety oculatus: A brilliantly colored form, with white groundwork, crimson back, and a large brown spot on each petal like the markings of a peacock,... 25
Variety citrinus: Clear lemon-yellow, with scarlet penciling and eye-like spots, 20
Calochortus venustus: Petals white or pale lilac above, blotched with maroon and gold, ... 20
Variety purpurascens: A brilliant purple form, ... 20
Calochortus splendens: Like the preceding, ... 10
Calochortus Palmeri: A fine form not in stock, ... 50

Birds' Eggs.

(Ridgeway's Nomenclature.)

Number.		Price each
1	Wood Thrush,	.10
7	American Robin,	5
12	Cat Bird,	5
13	Brown Thrush,	5
22	Blue Bird,	5
27	Blue-gray Gnatcatcher,	40
51	White-bellied Nuthatch,	40
63	House Wren,	5
67	Long-billed Marsh Wren	10
68	Short-bill Marsh Wren	50
74	Black-and-white creeper,	50
93	Summer Warbler,	5
99	Chestnut-sided Warbler,	20
115	Golden-crowned Thrush,	15
122	Maryland Yellow-throat,	20
123	Yellow-breasted Chat,	15
128	American Redstart,	10
135	Red-eyed Vireo,	10
145	Bell's Vireo,	20
149a	White-rumped Shrike,	15
153	Cliff Swallow,	5
154	Barn Swallow,	5
161	Scarlet Tanager,	20
198	Yellow-winged Sparrow,	25
212	Clay-colored Sparrow,	40
214	Field Sparrow,	10
221	Song Sparrow,	5
233	Swamp Sparrow,	10
237	Chewink,	20
244	Rose-breasted Grossbeak,	20
254	Black-throated Bunting,	15
257	Bobolink,	15
258	Bow Bird,	5
260	Yellow-headed Blackbird,	15
270	Orchard Oriole,	10
271	Baltimore Oriole,	10
278b	Bronzed Grackle	10
282	Crow,	5
289	Blue Jay,	10
304	Bee Martin,	5
315	Pewee,	5
324	Acadian Flycatcher,	25
325 a	Traill's Flycatcher,	25
326	Least Flycatcher,	10
335	Ruby-throated Humming Bird and nest,	4 00
354	Whip-poor-will,	75
357	Nighthawk,	50
382	Belted Kingfisher,	20
387	Yellow-billed Cuckoo,	20
388	Black-billed Cuckoo,	15
395	Long-eared Owl,	50
402	Screech Owl,	50
405	Horned Owl,	1 50
425	American Osprey,	40
430	Marsh Hawk,	40
431	Coopers Hawk,	30
436	Red-tailed Hawk,	50
454	Turkey Buzzard,	75
459	Passenger Pigeon,	50
460	Dove,	5

472 Ruffed Grouse,..... 15
477 Prairie Hen,..... 15
480 Bob White,..... 10
487 Great Blue Heron,..... 30
495 Black-crowned Night Heron,..... 15
497 Bittern,..... 50
516 Killdeer Plover,..... 25
557 Spotted Sand-piper,..... 15
573 Sora Rail,..... 15
579 Florida Gallinule,..... 10
580 Coot,..... 10
582 White Crane,..... 1 25
583 Brown Crane,..... 1 00
594 Canada Goose,..... 50
601 Mallard Duck,..... 20
609 Blue-winged Teal,..... 25
643 Double-crested Cormorant,..... 25
674 Franklin's Rosy Gull,..... 2 50
685 Forster's Tern,..... 20
693 Black Tern,..... 10
735 Grebe,..... 15
Australian Apteryx,..... 15 00
Ostrich,..... 2 00
Emu,..... 2 75

☞These eggs are guaranteed true to name. Postage or express charges extra.

Minerals.

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Galena ore, silver bearing,.....10 to 25
Tin ore, 3 to 8 per cent metal,.....10 to 25
Pyrite of iron, gold bearing and Iridescent,..... 10 to 25
Quartz, milk white.....10 to 20
" Rose, beautiful pink.....10 to 25
" Clear.....10 to 20
" Smoky translucent.....10 to 25
" Crystals, clusters, etc.....15 to 1 50
" Nodules, spherical, indented, interesting.....10 to 50
Mica, in white spar and quartz.....10 to 25
" Schist, fish-scale mica.....10 to 20
" Uncut, foliated, white.....10 to 20
" " " black.....10 to 20
Gypsum, chalk-white.....10 to 20
" crystalized.....10 to 20
Selenite, white, glossy, foliated.....10 to 25
Dendrite, ('forest rock') fine fern on yellow porphyry.....10 to 50
Tourmaline, black, massive.....10 to 25
" Needle crystals in a mass, new, elegant.....10 to 50
Tourmaline in white quartz.....10 to 35
" in spar.....10 to 25
Garnet slate, surface warted with garnets.....10 to 50
Dog tooth spar, clusters of coarse white crystals.....20 to 75
Rock crystals, mass calcite.....10 to 35
Calcite Xld, needles and cleavages....10 to 20
Calcite crystals in clusters.....15 to 40
Petrified, pine wood.....10 to 20
" moss.....10 to 20
Feldspar, white and blue tinted.....10 to 25
Silver ore, $50 to the ton.....10 to 30
Gold ore, attractive.....10 to 25
Porphyry, cont'g Xls of feldspar and tourmaline.....10 to 20
Marble, tinted red to yellow.....10 to 20
Beryl, opaque variety.....10 to 2 00
Moss agate.....10 to 1 00
Free gold ore.....75 to 5 00
Native silver ore.....50 to 2 00
Asbestos, fibrous.....10 to 20
Stream tin, assays 60 per cent metal, per oz..... 05
Uranite, very beautiful greenish-yellow incrustation.....50 to 1 00
Antonite, from Lower California, with a silvery lustre,.....20 to 1 00
Brazillian and Prussian agates, polished, 2 by 3 inches banded onyx. ribbon, carnelian, fortification. Each.....50 to 1 00
Smoky Topaz crystals,.....25 to 75
Amazon stone " .....30 to 1 00
Pink Satin Spar.....20 to 50
Moss Agate pebbles.....10 to 25
Obsidian " New Mexico.....10 to 25
Amethyst, lavender and purple.....25 to 1 00
Satinwood Iron ore, fine grained.....15 to 50
Copper Pyrites.....10 to 35
Pyrolusite, Needle Iron.....15 to 40
Ribbon and Banded Jasper Iron.....20 to 50
Crystalized Copper.....50 to 2 00
Tin Ore, Cornwall, England..... 25
Jet, genuine, Yorkshire, England..... 25
Catlinite, (red pipe-stone, from which Indians make their pipes,) from Dakota and Minnesota,.....15 to 35
Cerargyrite horn-silver.....10 to 1 00
Mexican Onyx..... 65
Green Moss Agate..... 50

Indian Relics.

Moccasins, Papoose size, partly beaded.....1 50 to 2 00
Moccasins, Adult size,.....2 50 to 4 50
Pipes, red pipe-stone, plain and ornamented,.....2 50 to 7 00
Tobacco pouches, beaded and quilled, elegant,.....2 50 to 8 00
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Match Safes..... 75
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" Work Bag..... 2 50
Baby Carrier, Heavily Beaded..... 8 00
Buckskin Vest, quill worked..... 4 50
Indian dolls, Buckskin-covered, dressed Indian fashion,.....1 00 to 2 00

Arrow and Spear Points.

Flint, quartz, Jasper, etc., perfect,...10 to 25
" " " " slightly imperfect,.....05 to 15
Agate, obsidian, carnelian, etc., small and perfect, noted for beauty,.....50c to 1 00
Same, slightly imperfect,.....15 to 50
Spear-heads, perfect,.....25 to 50
Topaz, obsidian, agate, etc. from Oregon and New Mexico, perfect, per doz..... 3 50
Each,..... 35 to 50
Slightly imperfect, per doz..... 1 50
Flint, quartz, jasper, etc., perfect, per doz. .....75 to 1 75

Corals.

'We wandered where the dreamy palms
Murmured above the sleeping wave;
And through the waters clear and calm,
Looked down into the coral cave.'

Meandrina clivosa, Verrill, Florida, each .....25, 50, 75, and 1 00
Meandrina sinuosa, Les., Florida, each .....50, 1 00 and 2 50
Madrepora palmata, Linn. Florida. Fine specimens.....50, 75 and 1 00
Madrepora cervicornus, Linn Florida .....50, 75 and 1 00
Madrepora convexa, Dana, E. Indies, 50, 1 00
Leriatopora Spinosa, E. & H. Africa, and several other species.....50, 75 and 1 00
Millepora alcicornis, Linn. Fla. 25, 50, 75, 1 00
Merulina ampliata, Ehr. Singapore, very fine.....1 00, 2 00 and 3 00
Galaxea Musicales. Oken. Singapore, ...75, 1 00 and 1 50
Caeloria daedalina, Var., Verrill, East Indies.....50, 75 and 1 00
Dichocoena porcata, E. &. H. Florida, ...1 00, 2 00 and 3 00
Orbicella annularis, Dana, Florida, ...25, 50, 75 and 1 00
Siderastraea galaxea, Blaiby Fla. 50, 75 1 00
Porites astraeoides, Lam. Fla. 50, 75 and 1 00
Porites clavaria, Lam. Fla., 50, 75 and 1 00
Tridacophyllia manecina, E. & H. Singapore.....50, 75 and 1 00
Fungia (several species) 25, 50, 75 and 1 00
Hydrophora exesa, ... 1 00
Madrepora plantaginea, ...50 1 00
Madrepora prolifera, ...50 1 00

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This beautiful tree-like coral grows in clusters with hundreds of lateral branches, being the finest of all the plant-like animals that grow in Neptune's Flower Garden. Size, 2 to 3 feet high. Price, 1 00
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White Murex, Murex ramosus, Linn. East Indies, ...25c, 50 and 75
Black Murex, Murex radix. Gmel. Panama.....25c to 50
Rose Murex regius, Wood, Panama, 25 to 50
Cameo Shell, Cassis rufa; Linn, East Indies, ...25c to 50
Helmet Shell, Cassis Madagascariensis Lam. Bahamas.....25c 50 and 75
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Tertiary fossils.

Brontotherium Teeth, an animal of elephantine size, related to the rhinoceros. It had a pair of great horns. The back molars are about 3 inches square, and their teeth taper to small ones in front.
Single teeth.....50 to 6 00
2 teeth in part of jaw.....6 00 to 10 00

Titanotherium—Prouti teeth, an animal related to the tapir, of elephantine size, 7 or 8 ft. high. Back molars, about 2x4 to 5 inches, smaller toward the front.
Single teeth.....50 to 4 00
2 or 3 teeth in portion of jaw.....5 00 to 10 00

Hyracodon, or Rhinocerous teeth 1 to 2 more teeth in group.....50 to 1 50

Anchitherium (or three-toed horse) teeth, an animal two feet in height, resembling a pony, with three hoofs or toes to each foot
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Entire skull and both jaws, complete .....5 00 to 10 00
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Portions to complete turtles.....1 00 to 15 00

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Cypraea pantherina, Sol. East Indies .....12½ to 25
Cypraea exanthema, Linn. Panama 12½ to 25
Marlinspike, Terebra maculata, Linn Moluccas, ... 25
Oval Egg Ovulum ovum, Linn. New Guin. 25
Ear Shell, Auricula auris-Midae, Linn. East Indies..... 25
Marble Cone, Conus marmoreus, Gmel. China.....25 to 35
Conus betulinus,..... 1 00
Virgin Cone, Conus virgo, Linn. East Indies.....25 to 50
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Pecten Irradians, Lam. Long Island, very fine cabinet specimens 25 cts. size 3¼ to 3½ inches.
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Tridacna Squamosa, Lam. Bombay, 25, 50, 75
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Scorpion,..... 25
Barnacles,..... 05
Goose Barnacles,..... 10
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Strongylocentrotus purpuratus, (Purple Sea-Urchin,)..... 10
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Fiddler Crab,..... 15
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" " " 5 x 1 x 1 inches 05
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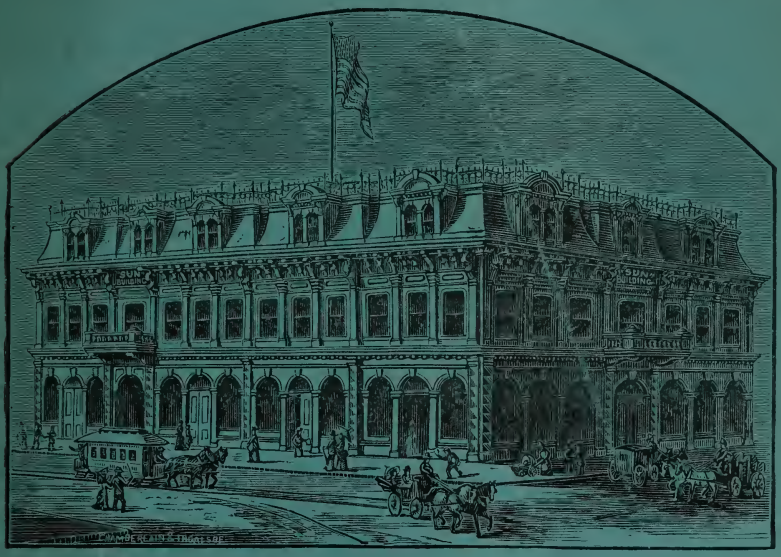

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THE

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A Popular Review and Record for the Pacific Coast.
Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, EDITOR.

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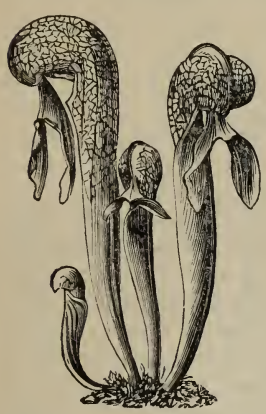
DARLINGTONIA CALIFORNICA.

MUCH attention of late years has been given to the study and culture of insectivorous plants by botanists and horticulturists. Probably none of these curious plants has attracted more notice than the Darlingtonia of California, which is represented below.



This Californian plant is a perennial herb of a greenish-yellow hue, with tubular and hooded leaves and nodding purplish flowers. In its native state it is found in mountain swamps and along the borders of brooks, at an elevation of from 1,000 to 6,000 feet, from Truckee Pass to the borders of Oregon.

It belongs to the same family as the Sarracenia, or pitcher-plant, of the East, and the curious leaves are contrived and fashioned in such a way as to form one of the most remarkable natural fly-traps known.

One side of the leaf is mottled and gayly colored, to attract the fancy of any insect that may be near or flying past. An insect upon alighting and roaming over the surface, soon enters upon a broad and open road. A line of honey entices him on to an orifice on the under side of an inflated sac near the summit. An expansion, like a fence, borders the road on either side and gradually narrows it in. Sharp bristles, all pointing one way, beset the path and makes an onward course the natural one to travel, directly into the dangerous opening that yawns above, and the way is sweetened with honey besides.

New pastures of honey tempt the unfortunate victim within the vaulted chamber. When satiated and he would leave,

translucent windows in the dome above entice him away from the dark door in the floor by which he entered. No avenue of escape is found, and from the shape of the cavity and the needle-like hairs pointing ever downward, the destruction of the captive is sure. Thus he was attracted to the plant, then enticed within, then imprisoned, and ultimately consigned to the sweet lake in the bottom of the pit.

The tube of the leaf is often filled with the dead insects for several inches in depth. Flies are the most numerous victims, but bees, butterflies, grasshoppers, beetles and even snails are entrapped.

In Europe, where the culture of this interesting plant has been carefully watched by skilful gardeners and horticulturists, it has been very successfully grown in shallow pots, becoming strong and vigorous, but space forbids further details of the interesting habits of this plant or of the best methods of its culture.

Read before the Historical Society of Southern California.

TRAP-DOOR SPIDERS.

[CONCLUDED.]

THE Ctenizas will attack and bury their fangs in each other with a strength and ferocity painful to witness; but when separated they seem to have sustained no injury, and go about their several callings as though such encounters were of ordinary occurrence. That it is not suddenly fatal is shown by the fact that crickets and other prey often move and kick even when partially devoured by spiders. Probably when a spider dies very soon after being bitten by another, the death is not caused by poison, but because the fang has pierced the central nerve mass. I long ago learned that the quickest and easiest way to kill certain small spiders of the East, was to thrust a needle into the middle of the cephalo-thorax. They would be paralyzed immediately and die very soon. It affects Trap-door spiders the same way but not so suddenly.

The testimony of many writers shows that spider bites are not generally more dangerous than mosquito bites, and sometimes occasion no more inconvenience than the wounds of a needle; and that most insects if they could escape the grasp and sucking jaws of the spider after being struck, would stand a fair chance of recovery.

Enthusiastic naturalists have allowed spiders to bite them repeatedly without serious results ; but as far as personal application is concerned I am perfectly willing to depart from scientific methods and take on faith the statement that the poison of a spider is not poisonous. There are noticeable differences between male and female spiders. The male Cteniza is smaller, darker colored, has much smaller abdomen, longer legs, and his maxillary palpi have one crooked joint, and are armed with spurs or hooks. He is also very much more active.

I have never been able to find the hiding places of males, and in two years have only obtained two specimens. These were caught by some boys soon after a severe rain storm. They probably hide away among mustard stalks and under leaves and have no settled homes. As there are few stones and no beds of matted leaves, the male Trap-door spider must be an adept at hiding, especially in the day season. It is said his shyness is due to the cannibal tendencies of the female, who shows her conjugal thrift by eating a husband whenever the larder is empty, or she happens to be in an ill humor. The females are the solitary dwellers in the tube houses. These holes are dug all over the foothills and often on level ground. It is often said that they prefer a certain exposure, I think northerly, but I have found the nests at all heights and all slopes of the hills, and believe they have no preference. All they need is seclusion. They are found by the dozens on many hills, and frequently there are four or five within a few feet of each other. It looks as though the young of one family located as one colony after leaving the parental cellar, and live peacefully. This proximity suggests that unconfined they are not such ferocious cannibals as painted, or that food is abundant. I do not know what the food is. Probably the staple articles are crickets and sow-bugs. That it is plentiful is shown by the plump condition of the spiders when they are dug from the ground. I never found any remains of food in or around the nests. In confinement they eat flies and crickets and devour each other with great relish, or they will live months without food. It is next to impossible to starve them out of their nests. I have known specimens to shut themselves up by webs and stoically starve to death in nests left on window sills in rooms where they were alone most of the time, and where they could have caught flies by leaving the tube. There is something almost pathetic about this feminine domesticity were it not so ex-

tremely stupid. Possibly, even with this adjunct, it appears to some minds as an eminently suitable and proper way of dying.

On the hills they make the nests from eight to ten inches long. They are rarely straight. For a few inches they are verticle, then they gradually curve, generally up hill, and sometimes there is a double curve. I have one that has a sharp turn near the bottom, almost at right angles to the general direction. On account of these curves no caller is able to tell whether the lady of the house is at home by looking down the hallway. Generally the walls are silken-lined throughout, but some individuals are not particular and leave the lower end bare. Then these mud walls are scarred and marked with impressions of the spider's claws.

The door is the most curious part of the nest. It is sometimes so well fitted that it is impossible to open it without the aid of a penknife, but it can always be opened without injury to hinge. The silk on the hinge part is thick and strong. The hinge line is generally toward the top of the hill, but not always, for I have found nests that open up hill and side wise. Considering the rush with which rain comes here it would be provident always to have the doors open downward, so as not to be swept open by the floods. The hinges are always made so strong that they spring the door to, regardless of inclination of position. The door stands at about an angle of 45 degrees and shuts as soon as the spider has crawled out. The worn hinges of specimens that have been handled do not give a correct idea of the tension of web in inhabited nests.

The spiders are nocturnal or crepuscular. After four o'clock in the afternoon it is not uncommon to see a door gently fall to on the approach of footsteps. Spiders often betray their nests in this way. If an attempt is made to open the door, one finds that the spider is holding it down on the other side with considerable strength. She catches her claws in the silk and braces herself against the walls by means of her many legs, and pulls for dear life.

In every door there are four or five little holes in the silk opposite the middle of the hinge, which might be called inverted door knobs, and in these she inserts her claws to open or shut the door. When she finds her efforts are of no avail and the door slips from her grasp, she hastens to her reception room at the bottom of the tube, and, throwing herself backward with all feet and her cruel fangs upturned to receive anything that descends, she waits patiently for future de-

velopments. The spider will move quite large stones that fasten the door, but if it is pinned back so she cannot lift it, she will build a new door. I have tested them many times in this way in the spider towns of the foothills. Not long after one successful experiment of the kind, I heard of a very rare specimen of a "Tarantula's" nest in one of the stores, for which the dealer would not take any price, because it was such an uncommon thing for spiders to have double doors to their homes!

I removed the door from one of my spider's houses and she built seven doors in succession in a short time; but some are content when the door is torn off to spin a web over the opening. Sometimes the screw seed-vessel of Alfilaria worms its way into the top of the door and makes a convenient handle for us to open the portal, or a bit of grass roots there and hides the dwelling; but I have never noticed any attempt on the part of the spider to cover the trap with vegetation as a protection.

The nests are well hidden by burr clover and crane's-bill in the green season, and in the dry season, when most they need concealment, the earth is so baked and cracked that it takes a keen and experienced eye to pick out the trap doors from the multitudinous mud cracks which surround them.

After the young leave the mother they can easily conceal themselves in the cracks and fissures of the dry soil, and their first tiny nests are so small as to escape detection. The smallest I have seen have been in diameter about the width of a pea. They are said to enlarge their tubes from time to time, as they increase in size. The young must leave the nest very early, for I have never found any with the mother except the swarms that are there in April and May, and the little ones then are about the size of a medium pin head. They probably make their tubes in summer, for the floods of the rainy season would sweep them out of temporary resting places and out of existence. It is reported that the mother shuts herself up in the nest and offers herself an unresisting victim to the insatiable appetite for her swarming offspring, and that after the repast they go forth in the world refreshed and ready for the duties of life. I trusted to this cannibalism in an attempt to raise some young. There were hundreds of them—little reddish mites creeping over the mother—and, believing in the survival of the fittest, I left them to devour her and each other, and thus help along my studies. When I examined the nest months afterwards, the mother was alive and had spun a

loose web over the mouth of the broken tube and the young had all crept out and died in the crevices of the earth. They had not eaten each other to any appreciable extent, and certainly had not filled the traditional contract to devour their devoted mother.

There is a fact that gives a faint color of truth to this belief. Sometimes the doors of a nest is sealed down. A ring of silk, almost a quarter of an inch wide is woven inside, holding the door fast to the tube. This thick white band can be separated from the nest, showing that it was added after the house was completed. At the bottom of the tube is found the shell of a spider, not the shriveled up body. If the young ate her, how did they get out afterwards? If she found herself wounded unto death, and sealing her door she hid away in the silence and darkness to make her home her tomb—Who ate her? The sides of the tube are smooth and solid, the woven silk is close and compact, the remains are of a victim or eaten subject, not of a mummy, and it is not easy to explain the phenomena.

Nothing is more interesting about these interesting people than the existence of such catacombs. As the door closes, like doors in a ghost story, of its own accord after the spider has left the house, she shows no little ingenuity in getting in when she comes home again. She feels around and gives a pull, and if the door sticks she removes debris that an unkind hand may have placed on the trap. Then as she cannot see downward, she continues to feel around with her feet for familiar places. She inserts her claws in the roughnesses of the earth and pulls till she finds the hinge side, then bracing her feet outside the tube to use as levers, she catches her fangs in the top opposite the hinge, and pulls upward by lifting her whole body. As soon as the door yields and opens a little she inserts her front feet and pulls it wider, and then sliding over the top when it is half open, disappears—pulling the door to after her.

The Ctenizas work readily in confinement. Sometimes they finish the tube before adding the door, and other times soon build the door and thus protected carry on improvements at their leisure. They generally work at night, but will pull down the door and remove obstructions from it in the day. They are so shy that it is difficult to catch them workrng. They will work in a lighted room if it is quiet, and in this way I have watched them build nests and make doors. They have an interesting way of getting rid of the earth when they are

digging. They carry particles of earth by means of the fangs pressed against the body, and when they reach the upper part of the tube by a quick jerk of a leg, they fillip them far from the nest. Thus the bits of soil are scattered far and wide and a heap is never seen at the mouth of a nest. I have seen them repeatedly throw earth in this way, and often heard it at night strike against the top of jars where they were working.

In digging holes they use the fangs, and can burrow in very hard soil, As a test, I put one in a cup of clay, tenacious as brick clay, and in a few nights she had dug a hole larger than a walnut, and she still seems disposed to go farther, although her fangs are coated a third of the length with the yellow clay. Then she brings up bits of earth from the inside, moistened in some way, and presses them against the side of the tube. Then turning around with her long spinnerets she spreads silk over the underside of the part that she has just stuck on. The spinnerets act like fingers and plaster the silk on carefully and dexterously. It seems all to be done by touch, rather than sight. This she repeats slowly and with great pains, adding bit by bit and smoothing the silk on the underside, and testing her work with her many hands, till the door is completed. Sometimes dawn comes before the labor is done, and then a little half door hangs on its hinges all day over the opening.

The strength of the door, the holes for holding it down, the tenacity with which the spider pulls on the inside, and the attitude she takes when she hastens down the tube—all show that she has to contend with shrewd enemies. Probably her most tireless foe is the Tarantula hawk. This is a wasp and there are several species that hunt spiders. The largest one is a gorgeous creature with red wings and bluish or greenish metallic-colored body.

Late in the afternoon when the spiders begin cautiously to open their doors these wasps are seen flying low and intently examining every hole and crevice in the ground. They fly into the squirrel burrows and walk all over them, with their bodies jerking in an impertinent and irritating manner, as they peer into the upper stories of these tenement houses. From this it seems that spiders must be added as attic lodgers in these communal dwellings; and surely with this addition, and the wasps as callers, there must be a Box and Cox arrangement as to hours, to prevent unpleasant encounters in the hallways.

The secret of the wasp's search is not food, but to lay up an inheritance for her young. When she encounters a spider a fight ensues, and, if she is victorious, she paralyzes but does not kill it, and then deposits an egg on or near the spider, and goes her way rejoicing. The spider is limp and helpless, but keeps alive till the wasp is hatched as a soft white grub. Then the baby wasp begins to eat the meat its mother has supplied in abundance to last through its babyhood. This admirable provision of the wasp—not quite so happy for the spider—is excellent in a dry climate where a dead spider would dry up in a short time and become very tough or dusty eating; but where a parylyzed spider keeps fresh and in good condition till needed. Mud wasps have the same way of storing up smaller spiders for their young.

The Cteniza resents familiarity and shows her displeasure by a sharp snap of the fangs or by moving off as fast as possible. This makes it difficult to examine live ones. They do not like to be touched. I have found a way, however, of keeping them quiet as long as I please. It is by pressing gently on the cephalo-thorax over the chief nerve mass. The spider stops crawling, ceases struggling and remains perfectly still. This is especially noticeable when they are turned on their backs. At first they fight to get back to their normal position, but a slight pressure stills them, their muscles relax and they can be examined at leisure. Even so slight a weight as a bit of writing paper will keep them immovable for a long time. These mesmerized spiders are rather ridiculous in this undignified position, lying flat on their backs, with their many heels all up in the air, and a plaster of white paper across the pit of their stomachs; and it cannot be very comfortable either, but they remain motionless for a quarter or half hour at a time, and may be kept from scrambling back on their feet as long as you will by a touch at the first sign of restlessness.

Aside from the curious homes I have not noticed any sign of superior shrewdness or intelligence in these spiders. They seem shy and slow and rather stupid. Their nocturnal habit keeps them from showing off well in the day time, but even at night they are not alert.

I tried the effect of certain color and odor by putting rose petals in their nests, but they merely carried them out as they would sticks and mud.

I tested their musical ear, as spiders are said to be musically inclined, by singing and whistling my sweetest, but they

seemed very phlegmatic about it and the sound produced no impression, not even uneasiness. Perhaps, though, they discriminate.

They are so slow that it requires much time and patience to study their habits, and then, in confinement, the conditions are not natural.

People are ready to believe anything phenomenal about a snake or a spider. Many of the stories of marvelous instinct and characteristics of spiders are woven from the golden tissue of romance and are too cobwebby to be touched without destruction, but it is a sorry wight, human or arachnoid, to whom no romance can cling, and it is not strange that the little brown anchoret in her silken cell in the foothills should be credited with more than ordinary intelligence when she shuts her door in the face of the world and retires to solitary meditation.

Miss Monks.

EMINENT NATURALISTS.—II.

RAFINESQUE.

"What an odd-looking fellow," said I to myself, as while walking by the river I observed a man landing from a boat with, what I thought, a bundle of dried clover on his back. "How the boatmen stare at him! Surely he must be an original."

He ascended with rapid step, and, approaching me, asked if I could point to the house in which Mr. Audubon resided.

"Why, I am the man," said I, "and will gladly lead you to my dwelling."

The traveler rubbed his hands together with delight, and drawing a letter from his pocket, handed it to me without any remark. I broke the seal and read as follows. "My dear Audubon—I send you an odd fish, which you may prove to be undescribed, and hope you will do so in your next letter. Believe me always your friend, B."

With all the simplicity of a woodsman, I asked the bearer where the odd fish was; when M. de T. smiled, rubbed his eyes, and with the greatest good humor, said, "I am that odd fish, I presume, Mr. Audubon."

Clean clothes were offered, but he would not accept them, and it was with evident reluctance that he performed the lavations usual on such occasions, before he sat down to dinner.

He chanced to turn over the drawing of a plant quite new to him. After inspecting it closely, he shook his head, and told me no such plant existed in nature. I told my guest that the plant was common in the immediate neighborhood, and that I would show it to him on the morrow.

"And why, to-morrow, Mr. Audubon? Let us go now!"

We did so; and on reaching the bank of the river, [Mr. Audubon lived in Kentucky, on the bank of the Ohio river,] I pointed to the plant. I thought M. de T. had gone mad. He plucked the plants one after another, danced, hugged me in his arms, and exultingly told me that he had got, not merely a new species, but a new genus!

When it waxed late, I showed him to the apartment intended for him during his stay, and endeavored to render him comfortable, leaving him writing materials in abundance. I was indeed heartily glad to have a naturalist under my roof.

We had all retired to rest. Every person, I imagined, was in deep slumber, save myself, when of a sudden, I heard a great uproar in the naturalist's room. I got up, reached the place in a few moments, and opened the door, when to my astonishment I saw my guest running about the room naked, holding the handle of my favorite violin, the body of which he had battered to pieces against the walls, in attempting to kill the bats, which had entered by the open window, probably attracted by the insects flying around his candle. I stood amazed, but he continued running round and round, until he was fairly exhausted; when he begged me to procure one of the animals for him, as he felt convinced they belonged to a new species!

M. de T. remained with us for three weeks, and collected multitudes of plants, shells, bats, and fishes. We were perfectly reconciled to his oddities, and finding him a most agreeable and intelligent companion, hoped that his sojourn might be of long duration. But one evening, when tea was prepared, and we expected him to join the family, he was nowhere to be found. His grasses and other valuables were all removed from his room. The night was spent in searching for him in the neighborhood. No eccentric naturalist could be discovered. Whether he had perished in a swamp, or had been devoured by a bear or a gar-fish, or had taken to his heels, were matters of conjecture; nor was it until some weeks after, that a letter from him, thanking us for our attention, assured me of his safety.

Thus wrote Mr. Audubon, in his "Ornithological Biogra-

phy," describing, under an assumed name, that most singular man, Constantine Schmaltz Rafinesque, the contemporary of Mr. Say.

He was born of French parentage, in Turkey, near Constantinople, in the year 1784. During his early life he showed a love for the study of natural objects, which overcame his interest in mercantile pursuits. Coming to the United States on a trading voyage in 1803, he was known as a botanist. He remained two years, and cultivated the acquaintance of the few naturalists then residing in the country. He then established himself as a merchant on the island of Sicily, and remained there until 1815, when he took his final departure for America.

During his stay in Sicily he industriously investigated the natural history of that island, and published many works on the same. He embarked with a great collection of specimens, books, and manuscripts, but suffered shipwreck off the coast of Long Island, and his precious possessions, for which he had labored so long and so hard, were swept into the ocean.

His property was so much impaired that he never recovered from the blow, but sunk from poverty even to destitution. His death occurred in 1840.

The writings of Rafinesque are admitted to show great talent and sagacity in certain respects, but they lack the sound judgment of Mr. Say. He was possessed with a passion for finding new species, and for combining into new groups all the objects which came within his observation. He especially erred in supposing that distinct species should be formed of natural objects, which present but trifling and unimportant variations, and his disregard for the previous work of other naturalists led them to withdraw their confidence, and, at last to relinquish all intercourse with him.

His passion for new species became a confirmed monomania, and though of late years more credit has been given to his writings, he doubtless created much confusion by needlessly multiplying genera and species, and by his brief, imperfect, and uncertain descriptions ; so that comparatively few of the numerous names which he bestowed are now acknowledged as having any value.

Mr. Rafinesque's later years were noted for the projection of many visionary financial and literary schemes. "With harmless egotism he magnified the importance of his own discoveries, and ascribed his reverses to machinations of secret

foes, and to the end, considered himself a most deserving, though unrequitted, laborer for the promotion of human knowledge."

Peace to his memory! May his enthusiam and scientific spirit, which, in some respects were in advance of the age in which he lived, be duly honored; and may naturalists ever take heed, as a lesson from his career, to join to their zeal, wisdom; and to wisdom, modesty.

Josiah Keep.

CALIFORNIAN AND POLYNESIAN FISH-HOOKS.

In his work on pre-historic fishing in Europe and North America, Dr. Rau has drawn attention to the similarity of South Californian and Polynesian fish-hooks of shell and bone, and he has figured a few from South Sea Islands for the sake of comparison. In consequence thereof, he received, a short time ago, from the ethnological department of the British Museum, a communication, together with a large plate of drawings of Polynesian fish-hooks preserved in the museum. Some of these are strikingly like the Californian specimens; not only does the curved points in these hooks approach very closely the shank, but they also show, like the Californian hooks, a barb on the outside. This analogy is the more significant, as some ethnologists have claimed a relationship between the Polynesians and South Californians.—*American Naturalist.*

HORIZONTAL WELLS.

Many people are now deriving their water supply from tunnels in the hillsides. It has been found that water can be thus obtained at an elevation which admits of its being distributed over wide areas either for house use or irrigation. In some places in the southern counties of California, tunnels have been run in near the sources of small streams, and thus a much greater supply has been developed than found its way into the streams originally. In other cases, the beds of such streams have been tunneled under, and the underground conduits of water cut off, and thus again supplies have been developed. Tunnels into the hillsides nearly always yield

water, though the amount differs widely. Sometimes not enough will be obtained to pay for the cost of the tunnel; again, the supply of a town or a considerable area of irrigated land will pour forth, and sometimes risk the lives of the workmen who are opening its way. Many times a man living near the hills can do much better by digging a horizontal well into his hillside, and thus secure running water, than he can by digging a vertical well and then be at the trouble of pumping it to the surface.—*Pacific Rural Press.*

ABOUT THE SWORDFISH.

Now the swordfish is a 'queer critter.' Whether he weighs 200 or 700 pounds, he is the same sly, ferocious, aggressive fellow—the most terrific foe a man can meet in the water, unless it is a man-eater shark, and porbably the swordfish can give even him some points. He is a vicious, aggressive fellow; actually malicious, wantonly ugly. His sword is a bony prolongation of his snout, often three feet long, and used as he can use it, it is a terrible weapon. He cannot only attack and even kill a whale, but will always attack a man, if he can get at him, and will not seldom attack a ship —burying his sword deep in the planking, and breaking it off —which serves him right, for this often kills the vicious fish.

Well, our harpooner on the little Ocean View, being duly warned by a shout from the look-out, who has discovered a swordfish off the weather bow, gets ready to throw his lance. The fish, after filling up with mackerel—on which he feeds—floats near the surface, motionless, his sharp sickle-shaped dorsal fin alone sticking out above the water, and serving to betray his position. If the boat approaches 'across his bows,' so to speak, or 'headon,' he will lie perfectly still and let it almost go over him; but you can't follow him from behind; he is suspicious of that situation and is off. He can dart like a flash of lightning. No other fish has such power of force and swiftness in darting. It is this that makes his otherwise not strong and rather harmless sword such a formidable weapon; a rifle, it is said, can drive even a tallow candle through a window-pane.

The harpooner throws his lance, and buries it deeply in the fish; perhaps throws it almost clear through his vitals; at any rate, the strong barbed iron 'holds.' The instant the harpoon is hurled, over goes the barrel, too, thrown by a person who is

watching for that exact moment—for the wounded fish darts off at an incredible rate, and makes the foam and spray rise well up over the barrel. This barrel reveals his course, as well as hampering him and wearying him; and one of the crew now lowers a boat and goes after him, to 'play' him, draw him in, and try to exhaust him. If he can only once get a loop around the slender bottom of that widely forked mackerel tail, he is sure of landing his prey—and not till then.—*Hartford Times.*

LITERATURE.

JOURNALS RECEIVED.—American Naturalist; Bulletin of the Torrey Botanical Club; Botanical Gazette; Journal of the New York Microscopical Society; American Microscopical Journal; Microscopical Bulletin; Naturalists' Companion; Ornithologist and Oologist; Century Magazine; St. Nicholas; Random Notes on Natural History; Bookmart; Journal of Mycology; Hoosier Naturalist; San Diego (daily) Union; Daily San Diegan; Riverside Enterprise; National City Record; American Rural Home; San Bernardino Index; Censor; Plain Truth; Scientific American; Pacific Rural Press; Stanislaus Wheat Grower; Youths' Companion.

OTHER PUBLICATIONS RECEIVED.—Contributions to the Larval History of Pacific Coast Coleoptera. By J. J. Rivers.

Flora of our South-western Archipelago.—I. By Wm. S. Lyon.

Names and Addresses of Health Officers in Michigan, for 1886–87.

Proceedings and Addresses at the Sanitary Convention held at Kalamazoo, Michigan, June 1 and 2, 1882.

Thirteenth Annual Report of the Secretary of the State Board of Health of Michigan, for the Year 1885.

NECROLOGY.

George Busk, F. R. S., F. G. S., etc., an English naturalist, has recently died.

Frank K. Rising, of Lena, Illinois, a promising writer on natural history, died June 29th, at the age of 19 years.

Notes and News.

In coffee-growing countries, an infusion of the leaves of the tree is held by many as being superior to the infusion of the berry.

The volcano of Kilauea, in the Sandwich Islands, is again active.

An ancient and for a long time inactive volcano on the Island of Galita in the Mediterranean has resumed activity.

Vesuvius has broken out again.

The city health officer, in his report to the Board of Trustees, reported ten deaths in San Diego for the month of August. The causes were given as follows: Enteritis, 2; consumption, 2; convulsions, 1; malarial fever, 1; whooping cough, 1; suicide, 1; diptheria, 1; unclassified, 1. He places the population at 8,500—an increase of 4,000 in one year.

Mr. A. D. Pearson reports a Gambell's partridge from this county.

No. 18 was issued September 27th.

D. Cleveland has returned to San Diego from the East. He has been absent for more than a year.

Dr. C. C. Parry expects to winter in California.

C. Gilbert Wheeler has paid San Diego a visit.

A sea-monster, which was 'neither a shark nor a whale,' was recently observed in San Diego bay. It was said to move at the rate of fifty miles an hour, and was observed by several reliable people. It was subsequently captured and proved to be a wharf pile that had broken loose!

Three distinct shocks were felt at San Diego at about 4 a. m., on the 8th of October. The last was felt for several moments. They seemed to extend from east to west.

The second horticultural fair of San Diego county was held October 6, 7 and 8. A fine display of fruits was made by various sections of the county, and numerous other objects as well, illustrative of its resources.

An examination of 10,000 prescriptions by English physicians has shown the drugs most used to be chloroform, bromide of potassium, sal volatile, glycerine, syrup of orange peel, wine of ipecacuanha, sulphate of quinine, bicarbonate of soda, carbonate of ammonia and bicarbonate of potash.

There are nineteen known metals valued at over $1,000 per avoirdupois pound. The most costly is vanadium, which is said to be worth $10,000 a pound. Of these nineteen metals, only one is produced or used

to any considerable extent, and that is iridium, which is valued at $1,000 per pound. It is sometimes, but very sparingly, used in electrical experiments.

A MAN who lived in the swamp daily prayed to Jupiter for health. 'Pray from the hill-top, and your prayer will be granted,' answered Jupiter.—H. C. FULTON, in Random Notes on Natural History.

DURING his expedition to Mount Kilimanjaro, Mr. H. H. Johnson noticed a singular resemblance or 'mimicry' between the appearance of the tall red-brown antelope and the mounds built by the white ant. The color being the same and the long grass hiding the animal's legs, it was really difficult to distinguish an antelope from an ant-hill. A more ludicrous exactness was sometimes given to the mimicry by the sharply pointed leaves of a kind of squill, which suggested the horns of an antelope.

BALLOONS as an adjunct of warfare are attracting much attention in European military circles, and their possible value in times of peace are not entirely overlooked. An English writer remarks that the recent successful attempts at balloon-steerage in France have led many thoughtful persons to believe the day not to be far distant when we shall see balloons plying in well-paying passenger traffic between England and the Continent. Another writer adds that such a result would be no more wonderful in its way than the discovery and development of the telephone, which, though scarcely a decade old, is already so familiar to us that it no longer seems strange.

SINCE the scientific world was surprised, in 1877, by Cailletet's and Pictet's announcements of the production of liquefied oxygen, several experimenters—especially Wroblewski and Olzewski—have successfully attacked the problem of liquefying the so-called permanent gases. It was at first thought necessary to employ great pressure in addition to great cold, but in the later researches both oxygen and nitrogen, as well as atmospheric air, have been made liquid by intense cold at very moderate pressures. Among the interesting results obtained are the following: At 152 degrees below zero, Fahrenheit, chlorine forms orange colored crystals; at 175 below hydrochloric acid is a solid; at 200 below ether solidifies; at 202 below absolute alcohol freezes; at 299 below oxygen boils; at 312 below air boils; and at 337 below air boils in a vacuum. These extraordinary temperatures were measured by means of a hydrogen thermometer and by a thermopile. The lowest temperature yet measured is 373 degrees below zero, which was produced by the evaporation of solid nitrogen on suddenly reducing the pressure. From these results it appears probable that every known substance within the reach of man will be eventually obtained in solid form by the mere withdrawal of heat.

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SANTA CRUZ ISLAND.

BY E. L. GREENE.

An opportunity has lately been afforded me of visiting this largest island of the Santa Barbara group. Although it is perhaps the most easily accessible of them all, it has remained among the last to be explored scientifically. My own researches, the first ever made there in any branch of natural history, have been confined to botany; but in my several weeks of daily botanizing I could not but become more or less familiar with the physical aspects of the island in general, and my impressions thereof may be worth recording. The island is some thirty miles long and from five to ten wide, and, as seen from Santa Barbara, only twenty-five miles distant, appears to rise like a blue precipitous mountain range from the bosom of the sea. The near approach reveals nothing but a succession of sharply outlined hills rising abruptly one behind another, the highest ridge attaining an altitude of, I believe, a little under four thousand feet. This lengthwise range of mountain, which constitutes the body of the island, is intersected at short intervals by deep and narrow cañons which run down to the sea. In most of these running water is to be found at almost any time in the year, so that the island may be said to be well watered, and the common trees of the main land are to be found thriving in all these cañons, such as the large leaved maple, (Acer Macrophyllum) live oak, (Quercus agrifolia) poplar, (Populus trichocarpa) willow, (Salix lævigata) and many others. And yet, the tree which is commonest of all in similar situations on the nearest mainland, the sycamore (Platanus racemosa), is entirely absent from Santa Cruz. Heteromeles arbutifolia is altogether more abundant here than I have ever seen it elsewhere, but there grows along with it a fine large *ceanothus which is quite new to science. The mouths of these various cañons afford the only landing places along all the shore. The gravelly beds of the streamlets are the only portions of the island's whole surface, which lead down gradually to the sea. At such points only will the boatman or sailor find a narrow strip of beach,

*CEANOTHUS ARBOREUS, Greene, Bull. Cal. Acad. ii. 144.

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and that barely commensurate with the breadth of the cañon itself. With these exceptions, the whole coast of the island rises almost or quite perpendicularly from the water, the first terrace of comparatively horizontal ground setting in at the height of from twenty-five to five hundred feet above the tide. This lowest succession of slopes constitutes a considerable part of the best grazing land of the island. It is an open rolling district extending inland for a mile or more, everywhere intersected by the narrow gorges or cañons, covered with fine grass and dotted with clumps of scrub oak (Quercus dumosa) and some patches of manzanita, with here and there a grove of † Lyonothamnus, a tree peculiar to this island, very ornamental, of graceful contour, with ample fern-like leaves, and large corymbs of small white flowers.

Back of this terrace the land rises very abruptly, and breaks everywhere into rocky shelves and gorges, and the herbaceous and grassy vegetation gives place to a great variety of trees and shrubs. but of different kinds from those which occupy the deeper and larger cañons where water is. Here are dense forests of a small pine tree, doubtless of the same species, whatever that be, which is found on Guadalupe and Cedros, five hundred miles to the southward: clumps of a large fruited evergreen cherry, identical, I have no doubt, with Prunus ilicifolia of the mainland, but with foliage commonly of quite different character, but sometimes just the same, and altogether extremely variable: impenetrable thickets of manzanita, from out which there rises here and there a group of oaks, both Quercus chrysolepis and Q. agrifolia. Thus the northward slope of Santa Cruz is well supplied with wood, grass and water, and it is the favorite range of many thousands of the sheep with which the island is at present mainly stocked. From the summit of the highest ridge one looks southward, not down to the sea on the other side as one would expect, but rather into a long, narrow valley, beyond which arises a second range of mountain, less elevated than that whereon we suppose ourselves to be standing, yet high enough to shut out from view the ocean which lies beyond. Up and down this stretch of valley are fenced fields and vineyards, and, in the midst of all, an assemblage of cottages and barns. Here dwell the superintendent of the island and the forty or fifty laboring men who are variously employed to carry on the industries of farming, fencing and building, which the present enterprising owner of Santa Cruz has set on foot in addition to that of sheep and cattle raising, to which the island was exclusively devoted in earlier times, under other proprietors. A considerable stream, flowing all through the year, courses down the entire length of this valley, finding an outlet in the fine bay called Prisoner's Harbor. Its passage way through the mountains is an exceedingly beautiful cañon, broad enough in its bed to

† L. ASPLENIFOLIUS, Greene, Bull. Cal. Acad. i. 187.

form an easy roadway between the ranch and the wharf a distance of three miles. In the neighborhood of the landing are some vegetal traces of early settlers whose names are now lost: for example, the common castor bean grows luxuriantly along the bases of the bluffs, almost as if indigenous, which of course it can not be, and the tree has not been planted on the island by any one within the memory of people now dwelling there; and fennel, of equally undoubted foreign derivation, is plentiful high up on the hillsides, at this same point, but not elsewhere. Also a single large and shapely pear tree, very prolific and its fruit of fair quality, a tree which must be fifty, if not eighty years old, flourishes on a level piece of ground, just at the entrance of the cañon. The cañon though deep is not so very narrow, room being found for considerable groups, here and there, of live oaks, willows and poplars, besides a liberal growth of the smaller trees and shrubs, such as are familiar. But the precipices and rocky steeps on either side are the home of some more than usually interesting bushes, whose charm to the botanist's eye lies in the fact that they are peculiar to this island, have not been met with in any other part of the wide world, not even on the other islands of the group.‡

The two or three miles width of mountains which lie westward of the central valley, and form a dozen miles of the island's southward slope, bear a different vegetation from that of the northward slope. It takes the character of what is called, in California, chaparral, consisting of adenostoma, ceanothus, two species of manzanita, two or three kinds of scrub oak and a singularly large, shrubby §castilleia, the whiteness of whose foliage presents a striking contrast to the bright green of the other shrubbery amid which it grows. But the chaparral is neither so dense nor so universally prevalent as to exclude grassy vegetation, and the whole southward slope as well as the north side of the island affords abundant pasture. The oaks and manzanitas, although lower than the same species on the mainland, fruit plentifully, and this region is consequently the favorite haunt of countless wild hogs and small foxes. These two species of mammals, the first, of course, having been introduced, are the only wild animals larger than mice, which inhabit the island. Even the rabbits, so common elsewhere in California, are wanting here. The proprietor introduced, some years ago, wild turkeys from Texas, and they survive, but have scarcely multiplied, a circumstence to be accounted for by the almost incredible number of foxes which one

‡ ERIOGONUM ARBORESCENS, Greene, Bull. Cal. Acad. i. 11 and CORETHROGYNE DETONSA Greene, Bull. Torr Club, x. 41.

§ CASTILLEIA HOLOLEUCA. Shrubby, 3 to 5 feet high, white throughout with a dense floccose tomentum: branches slender, leafy, with axillary, elongated, very leafy branchlets: leaves all narrowly linear, entire, 1 to 2 inches long, less than a line wide: spike, 2 to 4 inches long, short-peduncled: bracts linear-spatulate, entire, on the uppermost 3-cleft, with cream colored tips: calyx 8 lines long, deeply cleft on the upper side, merely lobed on the lower: galea of the corolla shorter than the tube, exserted, straight.

Species allied to *C. foliolosa*, but many times larger, with denser tomentum, and different leaves and flowers.

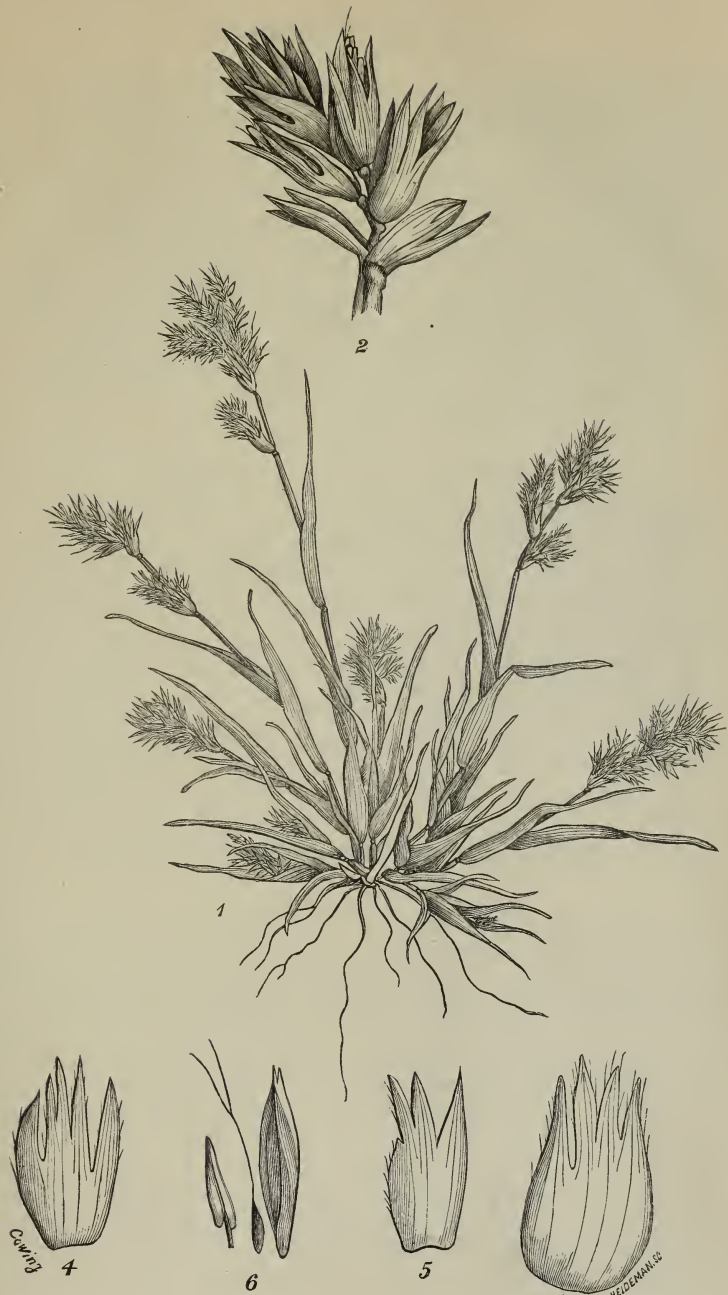
observes; and yet, the eggs of the California quail, which bird was also introduced, have in some measure escaped, for this species is fairly increasing.

From the summit of this southward range the mainland view is shut out by the higher altitude of the northern range; but looking out to the sea, on a clear day, one may perceive the low island of San Nicolas more or less distinctly, although it is more than thirty miles distant, and also San Clemente which is nearer and well elevated; and besides these a greater or less number of rocky islets and low reefs that are scattered up and down along the shores of Santa Cruz itself: most of them occupied by seals and sea fowl, their tide-washed foundations covered with shell fish, the abundance of which must have been, in former times, the principal means of subsistence to the aborigines of the island. The extensive and deep kitchenmiddings, which occur wherever there are springs, constitute one of the marked features of the Santa Cruz landscape. The store of ethnological materials which these ought to have furnished to our scientific collections, has long since been gathered in and transported to the museums of the old world, in reproof of our own slowness and indifference. But there still remains, in the flora and fauna, especially the rich marine portion, a most inviting field for future work.

A NEW GENUS OF GRASSES.

ORCUTTIA.—Tribe, *Festuceæ*, Subtribe, *Sesleriecæ*. Panicle simple; spikelets sessile, alternate, many flowered, compressed, upper ones crowded; empty and flowering glumes much alike, green and thickish, broad, 3 to 5 lobed, unawned, strongly many nerved; palet equaling its glume, hyaline, narrow, green on the strongly angled keels; anthers 3, styles 2, filaments and styles at length projecting beyond the flower.

O. CALIFORNICA.—Plant dwarf, 2 to 4 inches high, annually, growing in small clusters of 10 to 20 or more culms from one root, culms variable in length in the same cluster, generally producing some small flowering branches from the lower joints: leaves 2 or 3, the sheaths open and inflated, striate, ligule obsolete, blade rather rigid, about one inch long, acuminate; leaves and sheaths sparsely pubescent; panicle about one inch long, simple, usually of 4 to 6 alternate sessile spikelets, the lower 2 or 3 rather distant, the upper ones crowded; spikelets 5 to 10 flowered, empty glumes sparsely pubescent, broad, about 2 lines long, scariously margined, mostly 3 lobed, the 2 outer lobes longer, the lobes each 3 nerved; flowering glumes a little exceeding 2 lines, with 5 nearly equal, acute lobes, each lobe three nerved; palet as long as its glume, hyaline, narrow, strongly keeled, dentate at apex.



Orcuttia Californica, Vasey.

Sometimes several spikelets are clustered together at the apex of the culm, with only one pair of empty glumes for all.

This interesting little grass was collected in April last near San Quentin Bay, Lower California, by Mr. C. R. Orcutt, whose zeal and industry in the cause of natural science has greatly increased our knowledge of that region, and has brought to light a considerable number of new species in addition to the present genus. I take pleasure in naming it as a proper recognition of his work.

DESCRIPTION OF PLATE: Figure 1, plant, natural size; figure 2, a spikelet magnified; figures 3, 4 and 5, different forms of the glumes enlarged; figure 6, palet, style and stamen, enlarged.

DR. GEORGE VASEY.

THE GRASS OF THE FIELD.

If the humble grass of the field,
Whose bloom passes quickly away,
When morning breaks o'er hill and vale,
Is clothed in beauty's bright array.

Shall not the lovers of beauty,
By the Author of all things fair,
Be clothed with immortal bloom,
And His love and His glory share?

E. E.

November 16, 1886.

EMINENT NATURALISTS.—III.

AUGUSTUS A. GOULD, M. D.

The name of Dr. Gould well deserves a place in the list of those who have done noble work in the department of Natural History. A good man and a true, kind, patient, and full of perseverance, he has left an example worthy of imitation, and full of encouragement for all who are striving to accomplish by patience what they can not hope to gain by rapid and brilliant achievements.

A native of New Hampshire, born in 1805, most of his life was spent in Boston, in the practice of his profession.

He was a thorough student and wrote largely on conchological subjects, his most noted works being "The Invertebrate Animals of Massachusetts," and "Mollusks and Shells of the United States Exploring Expedition under Capt. Wilkes," "The Mollusca of the North Pacific Expedition under Capts. Ringgold and Rogers," and "Otia Conchologica."

On the death of Dr. Amos Binney, another name worthy of high honor, Dr. Gould was selected as the proper person to edit and complete the great unfinished work of that author on the "Land Shells of the United States."

To show the quality of the man, let me quote a few lines from a letter which I once received from Mr. Dall, now at the head of the Conchological Department of the Smithsonian Institution at Washington. He writes: "Dr. Gould, excellent man and naturalist as he was, when I went to him, a young fellow, with a question such as you have asked of me, said in effect, 'you must go ahead and earn your living, and use your leisure for study, as I have done, only don't wait for the leisure to be greater; do something, if but little, every day, otherwise, when wealth or age give you greater leisure, your interest will have faded and your opportunity will be gone.'"

Grand words, full to the brim of the true idea of education!

Mr. Dall adds: "Dr. Gould's work was done in the occasional spare moments of a not wealthy physician, in active practice, upon which he depended for his daily bread."

One of our most common shore shells, the little checkered Littorine, Littorina scutulata, received its name from this eminent naturalist. As you pick up the humble little shell on the beach let it always remind of the man who studied its peculiarities and gave it its name. Let it bring before you the most excellent advice and example of Dr. Gould, and remember that it is as good for any other department of knowledge as for the study of shells.

Oh, this question of bread and butter! How it weighs upon us. If only we were rich and had plenty of spare time, what marvels we would accomplish! How we would study and investigate; what books we would read, and what books we would write!

Would we?

Do most of the rich men whom we know indulge in such occupation?

Grand words are those of the busy physician, bringing cheer and stimulus to our aspiring, but sometimes almost discouraged souls:

"You must go ahead and earn your living, and use your leisure for study, as I have done; only don't wait for the leisure to be greater; do something, if but little, every day."

Dr. Gould's end was sudden, almost tragic; he died of cholera, Sept. 15th, 1866.

Though he was so suddenly called to lay aside his leisure hour studies, his published works remain and bear testimony to the excellent use he made of those fragments of time, which so easily might have been frittered away in idleness or unprofitable employments. The story of such a life is worthy of being recorded in a

book which may be widely read by the youth of our land. The active hours of the day spent in healing the sick and relieving pain; the leisure moments devoted to earnest, successful study of the beautiful and instructive objects of nature, and in recording these observations for the use of others: well may his modest words and his noble example bid us melt the yellow dust of our leisure moments into bars of solid gold. JOSIAH KEEP.

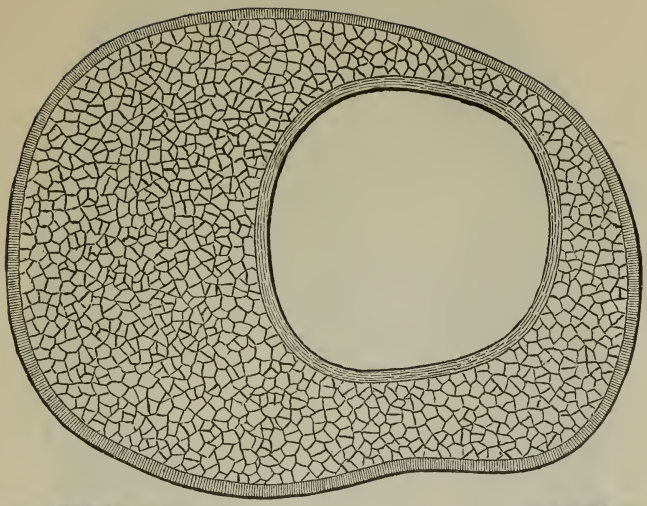
SOMETHING NEW.

A long time ago, we may call it millions or we may call it thousands, of years ago, a little colony of oyster-like mollusks began its existence beneath the ocean wave not far from where now stands the little town of Encenada de Todos Santos—the capital of the Mexican territory of Lower California. Another colony located in a part of the county of Mendocino, California; and doubtless many a colony was founded at about the same period of the world's history, along our shores, whose unwritten archives are still hidden from our view. However, Mother Earth, to whom we have to look for all our records of prehistoric life and times, has revealed her scanty records of these two settlements, made by the same race of bivalves, separated by more than five hundred miles of territory.

In January, 1883, a pleasure party of naturalists visited the shore of Todos Santos bay, a hundred miles south of San Diego by wagon road. Visiting the hut of a Canadian who possessed one leg and a reputation for fishing, in search of ichthyological treasures for one of the party, a number of curious water-worn boulders were found lying on the shingly beach. A couple of these, which seemed to most resemble shells, were carried to the wagon, and a year later found their way to the National Museum at Washington.

In 1885, H. C. Orcutt and the writer again visited this little cove on the bay side of what is locally known as Punta Banda. The Canadian was dead, but the shingly beach remained, and strewn along with volcanic rocks and recent shells were found others of this interesting fossil and forthwith a successful search for a bed of them was made.

The deposit was found exposed for only a few hundred feet, just above high water, large portions having been undermined by the waves in places and broken away. The strata was only four to six feet in thickness and was frequently broken, terminating abruptly and reappearing again, but sloping differently and showing an evident upheaval and dislocation at some period in its history. A strata of clay was found underlying the formation and cobblestones above, tertiary deposits overlying the whole, forming



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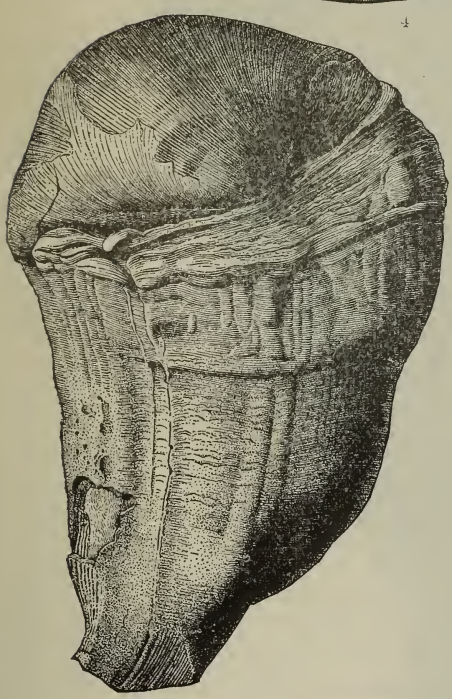

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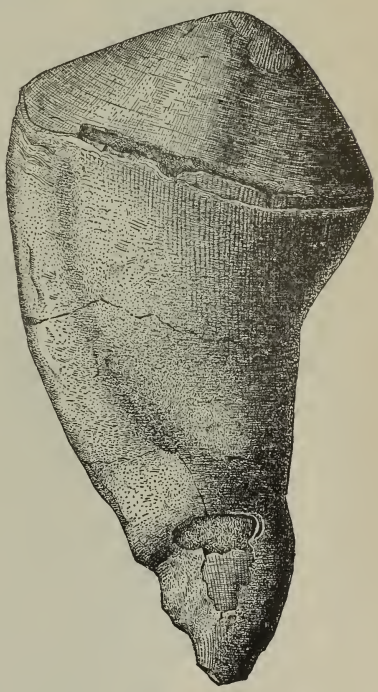

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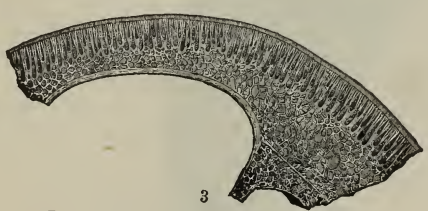

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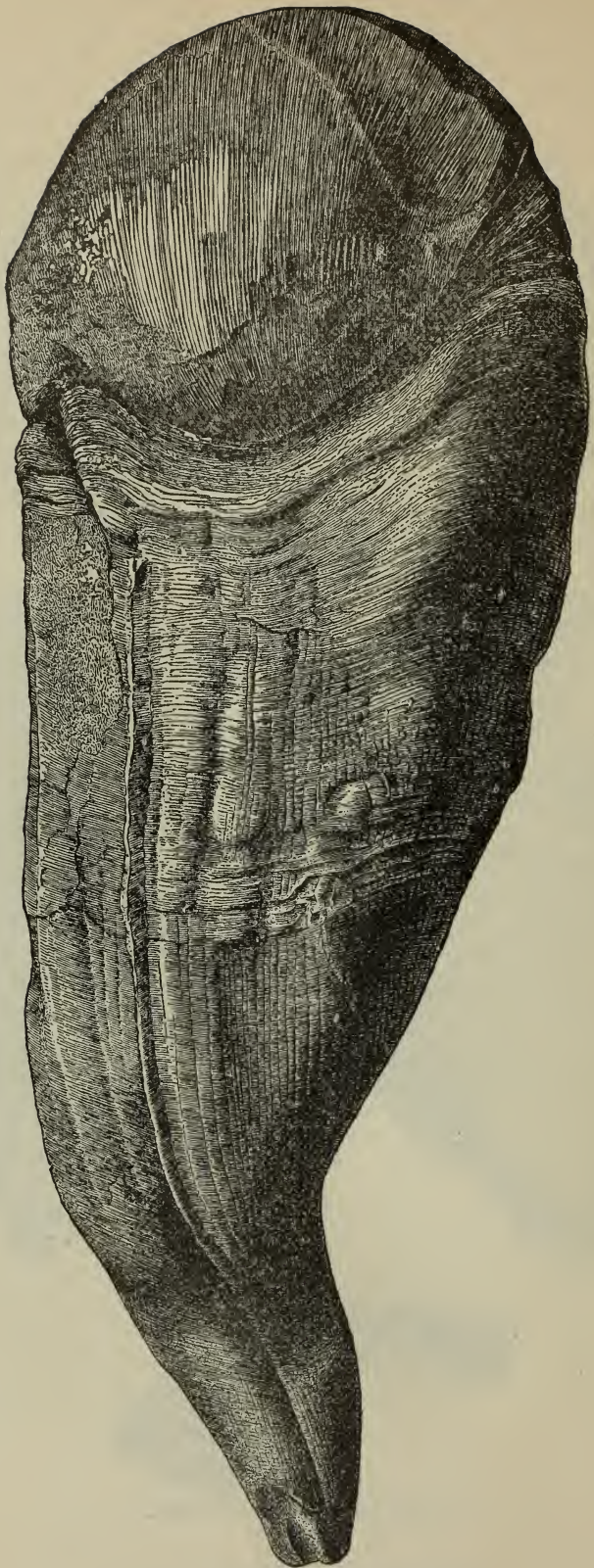
II. Coralliochama Orcutti, White.



1. Coralliochama Orcutti, White

steep cliffs fifty or sixty feet in height. The deposit was found to consist of this large fossil almost exclusively and only on the closest examination were we so fortunate as to discover others, several small univalve shells, which also proved to be new to science.

Another year passed by, during which time another collection was received at Washington from Mendocino county, where they had been discovered by Dr. G. F. Becker, and then Dr. C. A. White of the United States National Museum christened them with the name, Coralliochama, and pronounced them the type of a new genus.

Through the kindness of Prof. S. F. Baird and Dr. C. A. White we are able to present the accompanying illustrations of this interesting and curious fossil, about which further details may be given in a future paper.

EXPLANATION OF PLATES—I. Cardinal view of an adult example, natural size. II. Fig. 1, Cardinal view of a partly grown example, natural size. Fig. 2. Opposite view of another example. Fig. 3. Section of a portion of an upper valve, showing the outer prismatic layer, the inner porcellanous layer, and the cellular inner layer, with the vertical plates of the outer portion of the outer layer. Partly diagrammatic; natural size. Fig. 4. Diagram of a transverse section of a lower valve, showing the outer prismatic layer, the innner porcellanous layer, and the middle cellular layer.

SONOROUS SAND.

We copy the following letter by W. R. Frink from the Proc. Cal. Acad. Sci., V. 339, describing the peculiarities of the sonorous sand of the Island of Kaui, of the Hawaiian group:

'The bank, which is composed of this sand, commences at a perpendicular bluff at the southwest end of the island, and extends one and a half miles almost due south, parallel with the beach, which is about one hundred yards distant from the base of the sand-bank. This sand-drift is about 60 feet high, and at the extreme north end the angle preserved is as steep as the nature of the sand will permit. The bank is constantly extending to the south. It is said by the natives, that at the bluff and along the middle of the bank, the sand is not sonorous. But at the southern end and for half a mile north, if you slap two handfuls together, there is a sound produced like the low hooting of an owl—more or less sharp, according as the motion is quick or slow. Sit down upon the sand and give one hand a quick, circular motion, and the sound is like the heavy base of a melodeon. Kneel upon the steep incline, extent the two hands, and clasp as much sand as possible, slide rapidly down carrying all the sand you can, and the sound accumulates as you descend, until it is like distant thunder. In this experiment the sound was sufficient to frighten our horses, fastened a short distance from the base of the drift.

'But the greatest sound we produced was by having one native lie upon his belly, and another taking him by the feet and dragging him rapidly down the incline, carrying as much sand as possible with him. With this experiment the sound was terrific, and could have been heard many hundred yards distant. With all the experiments made, it seemed the sound was in proportion to the amount of sand put in motion with a proportionate velocity. Another consideration seems requisite, that is, its perfect dryness. The dry sand would sound on the surface, where six inches beneath it is wet; but if any of the wet sand become mingled with the dry, its property of sounding ceased at once. The sand appears to the eye like ordinary beach sand, but ordinary beach sand will not produce the sounds. It has been said that it lost its sonorous properties when taken away from the bank. But I can discover no diminishing of its sonorous qualities, even with the bottle uncorked, and we have had rain frequently and an atmosphere more than ordinarily moist for this time of year. Perhaps, if exposed to a very damp atmosphere, it might absorb moisture enough to prevent its sounding.'

TREES AWAKE AND ASLEEP.

Science has found out something very novel, namely, that the fruit tree slumbers in daytime and works at night. This modern idea is that fruit trees acquire most of their growth at night. The fruit of the cherry laurel, for instance, has been found by Dr. Krauss, of Halle, to increase at the rate of 90 per cent. at night and only 10 per cent. by day, while apples increase 80 per cent. at night and 20 per cent. in the daytime.—*N. Y. Mail and Express.*

SEA-URCHINS OR SEA-EGGS.

Strongylocenttrotus purpuratus, A. Ag., is the somewhat long name of the common sea-urchin or sea-egg found so plentiful along the coast from Puget Sound to Santa Cruz, Cal., and I do not know but its range is north and south of those points. It is eaten by some, and it was a choice dish upon the tables of the Greeks and Romans. I never tried to eat them, but have seen others do so, and they have said they were very fine. In color it is dark violet when alive, but the dried tests have a greenish tint. They are found at low tide in little holes in the rock, which they make by fixing themselves to the rock by means of their tentacles, and making an incision by means of their strong teeth. removing the debris with their spines as fast as it is produced It is a beautiful sight to go to Moore's beach at Santa Cruz, at low tide, and look in the tide pools, or aquariums as they are sometimes called, and see them all lined with violet sea-urchins, each in their little homes. They look some like a chestnut with the burr on,

with the exception of the color. They are much more beautiful in the water than out. They walk by means of their terminal suckers. Whatever their posture, they have always a certain number of feet, which carry them, and suckers, with which they attach themselves. I have seen the animal walk by turning upon itself like a wheel in motion.

S. Franciscanus A. Ag., is one of the largest of the sea-eggs, attaining a diameter of six inches across the test. It is found at various points upon the Pacific coast, from Queen Charlotte's Island to San Diego, and A. Agassiz gives Formosa also as one of its localities. At Santa Cruz, they are found at very low tide by wading out as far as you can, and feeling under the rocks, and great bowlders, once part of the cliff that rises up about thirty feet above the beach. The young ones are found nearer the shore. The S. Franciscanus are not so beautiful as the S. purpuratus, because they are brown when grown and a greenish white when young.

Echinarachnius exeentricus, Val , is the common cake-urchin of the Pacific coast, found at all points from Sitka to Lower California, and also at Kamtschatka. When dead it is a pure white with the almost perfect impression of a leaf of the lupine on its back. When alive, it is a very dark color, sometimes almost black, with sharp and fine spines covering it. It is sometimes washed up by the waves on the beach, but it don't stay long in sight because it burrows in the sand as soon as the waves that washed it up go back.—*Laura J. F. Hecox in Science Gossip.*

HABITS OF THE SCORPION.

A few years ago, while in the island of Jamaica, it was my fortunate chance to have an opportunity for observing some very curious facts in connection with that genus of the Arachnide class commonly known as scorpions and the curious traits of character in these insects Turning over some old papers in my office one day, I suddenly came upon a large black scorpion, who promptly tried to beat a precipitate retreat. Having read or heard somewhere that if you blow on a scorpion he will not move, I tried the experiment, and was greatly astonished to find that it had that effect. The scorpion stopped instantly, flattened himself close to the paper on which he had been running, and had all the appearance of 'holding on for dear life.' While I continued to blow even quite lightly, he refused to move, though I pushed him with a pencil and shook the paper to which he clung so tenaciously. Directly I ceased blowing, he advanced cautiously, only to stop again at the slightest breath. I was thus able to secure him in a glass tumbler which happened to be within reach, and then I determined to try another experiment as to the suicidal tendencies which I had heard ran in the veins of the Pedipalpi family.

On the stone floor of the kitchen attached to my office, I arranged a circle of burning sticks about three yards in circumference, the sticks being so placed that there were no means of exit through the fire. It was not intense, but small and quite bearable as regards heat within a few inches, so that the central part of the circle was perfectly cool. Into this center I accordingly dropped my scorpion, who, on reaching terra firma, darted off in a great hurry, only to be quickly brought to a halt on reaching within a few inches of the periphery of the circle. After a short pause of reflection, he deviated to the right, and ran once completely round the circle as near to the fire as it was prudent to venture. This he did three times, often approaching the burning sticks quite closely in his anxious endeavors to escape. In about a quarter of an hour, finding his efforts were useless, he retired almost into the exact center of the circle, and there, in a tragic manner raised his tail till the sting or spur was close to his head, gave himself two deliberate prods in the back of the neck, and thus miserably perished. As I placed the body of the suicide in a bottle of spirits, I almost regretted that I had not let him escape before he had resorted to such an extreme measure.

My last experience is even more curious than the preceeding, and it shows a remarkable provision of nature that is almost incredible. I was playing a game of billiards in a small village in the Blue Mountains; there was no ceiling to the room, the roof being covered, as is the custom in Jamaica, with cedar wood shingles. My opponent was smoking a large pipe, and suddenly, just as I was about to play a stroke, what I thought was the contents of my friend's pipe fell on the table. Instinctively, I was on the point of brushing it off with my hand, when, to my amazement, I saw it was a moving mass, which, on closer inspection, turned out to be a large female scorpion, from which ran away in every direction, a number of perfectly formed little scorpions about a quarter of an inch in length. The mother scorpion soon ended her feeble struggles; the whole of her back had been eaten out by her own offspring, of which we killed the astonishing number of thirty-eight. They had not only been carried by their parent, but they had lived on her, cleaning out her body from the shell of her back, so that she looked like an inverted cooked crab from which the edible portions have been removed. She had clung to her retreat in the shingled roof until near the approach of death, when she had fallen and given us this curious spectacle. I was told by the attendant that the young scorpions always live thus at the expense of their mother's life, and that by the time her strength is exhausted, they are ready to shift for themselves.—*Land and Water.*

At a white heat copper passes off into vapor, which burns in the air with a green flame.

THE LOVE STONE.

Queen Victoria has made the opal fashionable again. All the gifts of jewelry that she has bestowed among her friends for the past year have been opals.

To-day they are 100 per cent. higher than they were a year ago. Good ones sell for $55 a carat, and increase in price in almost the same ratio as diamonds.

The jewelers and precious stone dealers of the eighteenth century, who had invested largely in opals, were nearly thrown into bankruptcy by Sir Walter Scott, who, in one of his Waverly Novels, pretty nearly ruined the opal's reputation forever.

The best opals are said to come from Hungary, and everybody sends there for them. Now, the truth is that the best opal mines are in America, just where nobody is willing to tell, and the Hungarian merchants have been having them shipped to Hungary, where they are sold as a home product.

The ancients called the opal the "love stone," and no blooded young Roman or Greek would have even faintly considered engaging himself in marriage if he hadn't an opal ring for the girl.—*Selected.*

NECROLOGY.

Kendric Stillman Smith, born at Bellville, Illinois, January 24, 1869, died in San Diego, November 6, 1886. He was a careful, thorough young man of great promise, interested in oology and philately, and an earnest Christian.

Prof. H. H. Straight, formerly principal of the State Normal School at Normal, Illinois, and a well-known educator, died at Pasadena, California, November 19, 1886.

A CENTURIAN.

A distinguished French chemist, Michel Eugene Chevreul, celebrated his one hundredth year on the 31st of August. He demonstrated that oils and fats contained margarine, oleine and stearine. Hence, the stearine candle. He was director of the Gobelins Dye Works sixty years, and a close observer of the harmony of colors, etc. He presided over the Museum of Natural History many years and only gave it up in 1883. Mr. Chevreul owes his longevity to his strong constitution, temperance, industry and regular habits.—*Scientific American.*

CORRESPONDENCE.

VIENNA, Austria, August 19, 1886.

We had here a very hot and dry summer, from which we are only relieved since a few days by rain and cooler weather. M. L.

CARRIZO SPRINGS, Texas, Nov. 13, 1886.

I send you by to-day's mail a package of arrow heeds, most of which I have picked up since returning from your country a month ago There are also some bits of gum from the mesquite tree, the principal timber tree of this country. It makes an excellent article of mucilage, for which it is used to some extent here.

A. K. MELTON.

ENCINITAS, Cal., Nov. 18, 1886.

I find your little scientific publication quite interesting. Can you not give us an article on the clams of our coast, varieties, habits, where may be found etc.? Also tell an enquirer what makes the humming sound of the telegraph wire.

A READER WHO PAYS.

PROCEEDINGS OF SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY.—October 16, 1886. The annual reception was noted for the brilliant display of instruments and objects by the many enterprising members.

October 27, 1886. Numerous additions to the library were received. A new 'Zeiss' microscope was exhibited by the president.

SAN DIEGO SOCIETY OF NATURAL HISTORY.—November, 1886. The annual meeting was made memorable by the donation by Henry Hemphill of 1000 species of shells to the museum. The election of officers occurred with the following results: President, G. W. Barnes, M. D.; Vice-President, D. Cleveland; Rec. Sec., J. C. Sprigg, Jr.; Cor. Sec., Rosa Smith; Treasurer, Theo. Fintzelberg; Curator, C. R. Orcutt; Librarian, Miss S. Church; Board of Directors, Dr. G. W Barnes, E. W. Morse, J. G. Capron, D. Cleveland; Geo. Puterbaugh.

No recent announcement has given more pleasure to the lovers of high and pure literature, than that which promised the early appearance of *Scribner's Magazine*, an entirely new illustrated monthly. The famous monthly which bore the Scribner's name was a proof of their nice discernment and tact, and that they know exactly how to produce periodicals of the highest standard in letters and art, and at the same time achieve enormous sales.

EDITORIAL.

Christmas sends a merry greeting
To our friends throughout the world,
From a land of merry sunshine
To a land of sleet and snow.

With this number, THE WEST AMERICAN SCIENTIST enters upon its third year in the field of scientific journalism. The year of greatest peril to a venture of this character has been passed by, and we trust that many years of active usefulness remain for it in the future.

Dr. George Vasey, botanist of the United States Department of Agriculture, has kindly promised to contribute to our pages. The subject of his first article presented herewith, was a pleasant surprise, and we have to thank him also for the excellent figure accompanying it. The article was also furnished our contemporary, the Bulletin of the Torrey Botanical Club, and was intended to have been published simultaneously in the two journals in which intent we failed to carry out our part.

The third of Prof. Keep's interesting series on Eminent Naturalists appears in this number and will be read with interest by many.

Rev. E. L. Greene also contributes a valuable paper on Santa Cruz Island, where he did excellent work in botany the past summer.

We proposed to have made this issue a special immigration number in the interests of Southern California, but at the last moment have found it impracticable to do so from several reasons, chief among which was our not obtaining the expected map of San Diego County and adjacent regions, and the failure of several parties to honor their verbal contracts.

Subscribers, especially those who commenced with the 2nd volume, will please remember that we give twelve numbers for a year's subscription. As we have issued only nine monthly numbers during the past year, three more will be their due. However, many of our subscribers are now in arrears and they would greatly oblige us by paying promptly.

Now is the time our friends can greatly help this journal, by promptly renewing their subscriptions, by subscribing for their eastern friends, and by endeavoring to obtain subscriptions among their neighbors. Agents wanted to canvass.

Our readers will be pleased to know that Prof. Josiah Keep is preparing a new volume entitled "West Coast Shells." The excellent and popular little book, "Common Sea-shells of California," met a long-felt want, and as the edition of that volume is nearly exhausted, a new work becomes desirable.

NOTES AND NEWS.

Charles H. Marsh of San Diego is making some fine ornithological specimens this season.

No. 19 of this journal was issued October 30th.

Picotite has been found lately in the basalt of Mt. Shasta.

A plant possessing electrical properties has been discovered in South America.

Agassiz was born May 28, 1807, and died Dec. 14, 1873.

Mr. Lanfear, a man engaged in breeding camels in Texas, says of them that it is no more trouble to raise them than it is to raise horses and cattle. The colts for the first three or four days require close attention, but after that take their chances with the rest of the herd. They feed on cactus and brush, eschewing all grasses that horses and cattle eat if the favorite cactus can be had. Mr. Lanfear says there is one camel in his herd that has traveled 150 miles between sun and sun, and that almost any well-broken camel can travel more than one hundred miles a day.

The world can ill afford to lose those who out of their riches are continually doing good to the cause of religion. It can well afford to part with those who do nothing for its progress in a religious or philanthropic way.

The icebergs of the Southern hemispheres are much larger than those of the Northern and frequently attain a height of 1,000 feet.

Paper can be made transparent by spreading over it, with a feather, a very thin layer of resin dissolved in alcohol, applied to both sides.

Salt—or better still—saltpetre, finely powdered. placed about the wick of a candle, will prevent it from sputtering and cause it to burn slowly.

An essential oil is obtained from cloves by repeated distillations. It is a common trick to mix cloves thus deprived of their oil with others.

The production of manganese is steadily increasing. Owing to the imperfect means of conveyance it is estimated that two-thirds of the total quantity extracted is wasted.

From one ton of ordinary gas-coal may be produced 1,500 pounds of coke, 20 gallons of ammonia water, and 140 pounds of coal tar.

The torch of the Statue of Liberty on Bedloe's Island, New York bay, will contain eight electric lamps of six thousand candle power each, the light from which will be thrown directly up, making a powerful beam and cloud illumination.

J. G. Lemmon and wife are botanizing near San Luis Obispo.

A large quantity of chloride of sodium is held in solution in the waters of the ocean. Possibly under the common name of salt, this would be considered rather as a note than news!

Dr. Siemens estimates the temperature of the photosphere of the sun to be at least 3,000°.

Four German expeditions are now prosecuting their researches in Africa, two from the east and two from the west side of that continent.

Experimentally it has been shown that for every 600-litre wine cask the burning of twenty grains of sulphur, or even less, is enough to destroy the action of *micoderma vini.*

France, says M. Herve Mangon, produces milk, which, if collected, would make a stream 3 feet 4 inches wide and 1 foot 1 inch deep, flowing night and day all the year around.

In New Zealand, A. T. Urquhart states, earth-worms not only leave their burrows, but climb up trees in search of food in the night, or at a late hour if the morning is damp and warm.

Some English chemists and sanitary reformers have started a movement to make bread from the entire grain of wheat, and not from the inner portion only. The movement has the support of the first physiologists of the day.

Nickel is proposed to be a substitute for bronze in coinage in France. It is also suggested that the new coins shall be octagonal instead of round, so that the people may not mistake them for silver in the hurry of business.

With even a length of 600 yards of cable divers have been able to communicate with persons above water, to receive instructions, to ask for tools, to report investigations, and the course of submarine investigations all by telephone.

Dogs, under favorable conditions, live to an age much beyond that which is usually assigned to them. R. Cordiner of Oxford, England, knows a black retriever aged thirty-one years, and there is no doubt that others are acquainted with like aged individuals of the canine species.

Here is a hint by Dr. G. Boeck which may be of industrial value: If potatoes are peeled and treated with 8 parts sulphuric acid and 100 parts of water, and then dried and pressed, a mass is obtained very like celluloid, and which can be used instead of meerschaum or ivory. It is not stated whether the invention is protected by a patent or not.

The startling discovery has been made by M. Pasteur that the saliva of a person fasting is venomous, as it contains parasites which will inoculate. Breaking the fast deprives the saliva of its poisonous qualities.

The Queen of Spain has abolished slavery in Cuba. The slave owners are compensated by the government and therefore satisfied with the edict of emancipation.

Death from cold may be simulated for a longer time than is usually supposed in the case of the higher animals. Rabbits were shaved by MM. Richet and Rondeau, and inclosed in flexible tubes through which there was a flow of salt water, cooled to 7° C. until breathing and the action of the heart ceased. After suffering these mammals to remain in that condition for half an hour vital functions were restored.

A very heavy force is employed in the construction of the underground telegraphic connection between Marseilles and Paris. A cast iron pipe contains the cable, and it is laid nearly six feet beneath the surface of the earth. At intervals of 550 yards the cable passes through a chamber of cast iron, which is so constructed that it can be readily inspected whenever there is any necessity for that work. About every 110 yards the pipes are connected by cast iron boxes, which also enable the wires to be inspected and repaired. The cost in all is about $8,000,000.

Dragon's blood is a resin which exudes from various trees. It is so called from its red color.

We cannot determine the sound of a string which makes less than thirty vibrations per second, nor of one which makes more than 7,552.

LITERATURE.

The Youth's Companion celebrates this year its sixtieth anniversary, and well deserves its enormous subscription list of nearly 400,000 from the unobtrusive moral tone that pervades it and the variety of matter that it gives its readers of interest to both old and young.

That 'nothing succeeds like success' is proved by the history of the *Overland Monthly* which has gained a well-earned victory over its famous grizzly, so familiar to all, and has secured a prominent place among the great American magazines.

Science Series is a new venture in the journalistic field by H. M. Downs of Rutland, Vermont. Each number is to contain a complete popular article on some scientific subject.

Dr. Parry contributes another article to the Proc. Dav. Acad. Sci.. reinstating the genus Lastarriaea, and describing two new species from S. A.

Rev. E. L. Greene published a new genus of plants related to brodiaeas in the 6th bulletin of the Cal. Acad. Sci., together with

an arrangement of the plants generally known as brodiaeas, under several generic names, the reinstatement of Vogel's Syrmatium, and the descriptions of various new species—the result of his trip to the island of Santa Cruz.

The National Druggist, a weekly journal of St. Louis, is a welcome addition to our exchange list.

Prof. H. L. Osborn, of Purdue University, is acting editor of the *American Monthly Microscopical Journal* until further notice, during Prof. Hitchcock's residence in Japan.

We have to acknowledgs the receipt of a set of the bulletins of the American Museum of Natural History, Central Park, New York. Also various pamphlets from the University of California.

The Golden State Scientist is a new eight-page monthly, edited and published by the well-known collector, E. M. Haight of Riverside, California.

A NEW GENUS OF CHAMIDÆ.

Genus CORALLIOCHAMA (nov. gen.)

(Bulletin No. 2?, U. S. Geological Survey.)

Shells fixed by the apex of the lower, or right, valve, growing separately or in clusters. Test thick, consisting of three layers, the outer one being prismatic, the middle cellular, and the inner porcellanous. The space which was occupied by the animal was very small as compared with the bulk of the shell, and it is situated eccentrically. Lower valve irregularly subconical, more or less distorted, much deeper than the other valve; beak distorted as a consequence of its attachment to a foreign object; ligamental groove more or less distinct, extending from the apex to the hinge margin. Upper valve convex, its beak broad and incurved to the hinge margin of the lower valve; ligamental groove marginal; internal cavity partially divided into unequal parts by a more or less prominent longitudinal septum. Hinge essentially the same as that of Plagioptychus Matheron, Ichthyosarcolithes Desmarest, and Caprina d'Orbigny.

The test of both valves consists of a thin outer prismatic layer, a thick cellular middle layer, and a thin porcellanous inner layer. The middle layer constitutes the bulk of both valves. In the lower valve it consists of slender angular thin-walled tubes which extend the full length of the valve, increasing in number with the increasing size of the shell, each tube being divided into small cells by numerous thin transverse partitions. The structure thus produced somewhat resembles that of a coral of the Favositide, and it is also closely similar to that of corresponding parts of Radiolites and Sphœrulites. The inner portion of the middle

layer of the upper valve has the same cellular structure as that which has just been described for the lower valve, except that the longitudinal arrangement of the cells is not so evident; and the teeth of both valves are mainly or wholly composed of shell-substance which possesses this cellular structure. The outer portion of the middle layer of the upper valve, however, has a structure similar to that which is possessed by the upper valve of Plagioptychus. It consists of numerous thin, close-set radiating vertical plates or septa which extend from the beak to the free margin, their outer edges abutting against the outer prismatic layer, and at their inner edges they blend with the inner cellular portion of the middle layer.

This proposed new genus stands near to Plagioptychus, Ichthyosarcolithes, and Caprina, agreeing with them all in the general character of the hinge and of the ligamental grooves, and in the presence of an outer prismatic shell layer. It further agrees with Plagiotychus in the structure of the outer portion of the middle shell-layer of the upper valve; but it disagrees with that genus in the multicellular structure of the thick middle layer of the lower valve, and that of the inner portion of the middle layer of the upper valve; those portions being porcellanous in Plagiotychus. Comparing the shell-structure of Coralliochama with that of Ichthyosarcolithes, the cells of the former are seen to be much more uniform in size; and the large so-called water-chambers in the thick shellwalls of the latter are wanting in those of the former. Also the slender radiating plates or septa of the outer portion of the middle layer of both Coralliochama and Plagioptychus are apparently wanting in Ichthyosarcolithes. At least such a structure seems never to have been described.

CAROLLIOCHAMA ORCUTTI (sp. nov.)

Shell reaching a large size, growing both singly and in clusters, one example in the collection showing a cluster of eight individuals. Lower valve irregularly subpyramidal, usually much elongated and more or less distorted; its free border transverse or oblique, the posterior side in the latter case being the lower; ligamental groove somewhat distinct; the space which was occupied by the animal comparatively small, eccentric, the thinnest portion of the shell-wall being at the part which corresponds to the postero-basal part in ordinary bivalves. Surface, when the outer prismatic layer is present, marked by fine longitudinal lines, and somewhat more distinct concentric lines of growth. The coarser markings of the valve consist of a greater or less number of concentric undulations, which are crossed by longitudinal corrugations that are usually more conspicuous upon the side which bears the hinge, especially the part adjacent to the hinge margin. The prismatic layer is moderately thin, and is composed of

minute vertical prisms which are visible only under a lens. The middle shell-layer reaches a maximum thickness in old shells of nearly or quite 30^{mm}. This layer is composed throughout of a mass of very small, angular thin-walled cells. The cells have a good degree of uniformity of size, their longitudinal arrangement and angular shape being quite distinctly seen by side view of weathered specimens. By vertical view they are seen to be of irregular shape and arrangement, but concentric lines of accretion are sometimes observable in cross sections of the valve. The inner porcellanous layer is thin, and under a lens it is seen to consist of numerous concentric laminæ.

The upper valve is broadly convex, becoming large and strongly arched in old shells; beak prominent, broad, incurved and usually directed a little forward, but sometimes it has a slight backward inclination. Surface, when the outer prismatic layer is present, having an approximately smooth aspect; but it is marked by numerous lines of growth and multitude of very fine radiating lines. Specimens having the prismatic layer exfoliated or weathered off show the edges of the numerous close-set radiating septa of the outer portion of the middle layer. These septa are moderately deep, and are so joined together by their inner edges in pairs and double pairs, that the innermost spaces between them are wider than those which appear at the outer surface of the layer. The inner portion of the middle layer has a structure essentially the same as that which the whole of the middle layer of the lower valve possesses, but at the thinnest portion of the upper valve this cellular portion of the middle layer is obsolete or wanting especially in young shells. The fact that the specimens of this collection are so frequently crushed by pressure shows that they were not so strong as their great thickness would indicate.

All the details of the hinge have not been clearly ascertained, The principal tooth of the lower valve is known to have been very large and prominent, filling a large part of the space upon the posterior side of the septum of the upper valve. The anterior tooth of the upper valve is not well defined from the cardinal end of the septum, but the posterior tooth is narrow, prominent, comparatively long, and curved outward.

Fully adult shells reached a length of more than 200^{mm}, and a diameter at the free margins of 90^{mm} or more.

Upon a preliminary examination of the collections sent by Mr. Orcutt, and the less perfect examples obtained by Dr. Becker, owing to the multicellular structure of the shell, which was conspicuously seen, I regarded this form as belonging to the genus Sphærulites. But after a more careful study, and working a separated upper valve out of its imbedding matrix, it was found to possess the hinge-structure that has just been described. The specific name is given in honor of Mr. C. R. Orcutt, who first discovered it. (Museum No. 12,698.)

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VOLUME III. JANUARY, 1887. WHOLE NO. 21.

THE

West American Scientist.

A Popular Review and Record for the Pacific Coast.
Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - EDITOR.

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THE WEST AMERICAN SCIENTIST.

VOL. III. JANUARY, 1887. 21

NEW PLANTS FROM NORTHERN CALIFORNIA.

We seem to be very slow in attaining to anything like a thorough knowledge of the botany of the northern portions of our State. Since the days of Bolander's and Kellogg's collecting in the counties of Mendocino and Humboldt—and those days were more than twenty years ago—very few, if any notes or specimens have come in from that particular district. Mr. Rattan has made one or more vacation excursions in that direction, with instructive results, but that is all. Mr. Carl C. Marshall, a zealous and enterprising amateur, a resident of Humboldt County, gained the summit of the Trinity Mountains in July last, and brought back with him specimens enough to indicate that this new district which he has been first to set foot upon, botanically, merits a thorough and careful exploration. His collection, although only a small one and the species represented by very scant specimens, contains among other probably new species the following two Saxifragaceous plants.

RIBES MARSHALLII. Glabrous, branches with stout but rather short triple spines; leaves roundish, 5-lobed, the lobes incised; peduncles 1-flowered; flower pendulous, an inch in length; calyx-segments elongated oblong, spreading or recurved, dark red-purple; petals 2–3 lines long, spatulate oblong, salmon color, filaments slender, more than a half inch long; anthers very small for the size of the flower (¾ line long), oblong, obtuse at both ends; ovary very bristly.

Summit of Trinity Mountains, flowering in July near lingering snow-drifts. The species is a gooseberry, intermediate between R. Menziesii and R. Lobbii, with remarkably large and handsome flowers. The character and quality of the fruit is of course unknown

MITELLA DIVERSIFOLIA. Leaves all radical, ovate to orbicular, with 3–5 somewhat irregular, shallow but angular lobes, the margin otherwise entire and somewhat ciliolate, the base cordate with nearly closed sinus; scape a foot high, spike indistinctly unilateral; calyx-lobes white and petaloid; petals white, cuneate-oblanceolate, palmately trifid at the abruptly widened apex; stamens 5.

Growing near the habitat of the preceding species. Leaves thin and light green, variable in shape, very sparingly setulose-pubescent, the inflorescence minutely glandular under a strong lens. The following species hitherto undescribed is from somewhere in Mendocino County, but was brought in many years ago.

MITELLA OVALIS. Leaves all radical, 2 inches long, oval or oblong, obtuse, cordate at base, with closed sinus, the margin with shallow rounded lobes and mucronulate teeth, upper surface with scattered, appressed, rather coarse whitish hairs; petioles ferruginous-hirsute, the hairs deflexed; scape glabrous or nearly so, a foot high; pedicels very short; calyx-lobes very short and broad, green; petals green, pinnately parted at apex into 3-5 linear lobes; stamens 5.

Collected by H. N. Bolander and ticketed in the herbarium of the California Academy, M. trifida; but that species has the petals of the preceding species, namely, white and palmately trifid. In H ovalis the foliage is of firmer texture, more like that of a Heuchera than those of any other Mitella.

There is another plant in Mr. Marshall's collection, more interesting to me than even his new species and that he found, I believe, on the very shores of Humboldt Bay. It is that described in the Botany of California under the name Eritrichium plebeium, a species not before heard of except on the shores of the Aleutian Islands. We wonder greatly if this is really indigenous to California. Possibly it is but a recent acquisition accidently introduced from its distant and sub-arctic home. Can Mr. Marshall give us any light upon this problem?

Prof. E L. Greene.

EMINENT NATURALISTS.—IV.

ISAAC LEA, LL. D.

Few men are now living who were born before the beginning of the nineteenth century. As the years go by, such men are rapidly passing away, and their number is becoming less and less. Whenever we meet such a man we instinctively regard him with reverence, even if we are ignorant of his history. But when we learn that his long life has been filled with worthy deeds, and that for scores of years he has been regarded as one of the most learned and eniment men of the country, our respect and veneration are greatly increased.

Of all the scientific men of this country, very few, if any, have lived so many years or received so much honor as Isaac Lea. It seems almost like romance to read that his parents came over from England with William Penn, on his second visit, but such was the fact. Naturally they belonged to the "Society of Friends",

and settled not far from the City of Brotherly Love. On the second of March, 1792, their fifth son was born, while they were living in Wilmington, Del. They gave him the scriptural name, Isaac, and thus began the life which was destined to become so eminent, and which was to contribute so much to the scientific interests of this young country.

Isaac's father, James Lea, was a merchant, and from him he derived his business ideas; but his mother was a great lover of nature, particularly of flowers, and the science of botany was her great delight. Her son early began to show scientific inclinations and made little excursions about the neighborhood, noticing the rocks and minerals, though he knew little about their names and nature.

When fifteen years of age, he removed to Philadelphia and entered a mercantile house, where he met another youth of similiar taste, Vanuxem, by name, and these two friends took journeys together, in the vicinity of Philadelphia. They had but scanty time for their excursions, most of their time being spent in the store, but they improved their leisure hours, giving especial attention to the minerals of that region.

Reference books and museums were extremely rare in those early days, but the young naturalists soon found a friend in the Academy of Natural Sciences, which had then been in existence but a brief time. They soon became active members, learning from others, and contributing in turn the results of their explorations. Mr. Vanuxem went to Paris in 1816, and spent three years in the School of mines. On his return he was called to the professorship of chemistry in the college of South Carolina. He afterwards became noted as a geologist, and until his death, in 1848, the early friendship between these eminent men was continued.

Mr. Lea's first paper was published in 1818. Naturally it related to the subject which had engaged his early explorations; and was entitled "An account of the minerals at present known to exist in the vicinity of Philadelphia." His second paper on a geological subject was not printed until 1822. Meanwhile, in 1821, he had married Miss Carey, with whom he lived most happily for fifty-two years, and had become a member of the publishing firm of which her father was at the head. He continued to be a member of the successive firms for a period of thirty years.

His geological studies at length made it evident that a knowledge of shells was essential for their successful prosecution, and thus he was led to take up the study of conchology, that science which was to become his chief scientific employment, and to which he has made so many contributions.

The work of removing an obstructing sand bar in the Ohio river, undertaken by the government, brought to light some beautiful Unio shells, which were sent to the Academy by the officer

who had the work in charge. They were fine specimens, and greatly interested the members of that institution. Soon afterwards other shells of the same genus were added to the collection, and in 1827 Mr. Lea published a description of six new species, of which the first was Unio Calceolus.

When he published this paper he had no thought that our country was to prove the great home of this class of beautiful shells, yet this description of six new species was but the beginning of the multitude of papers which he has since written upon this interesting genus and its near relatives. More than two hundred publications, some of them voluminous and beautifully illustrated, have proceeded from his pen, and most of them have related to fresh water mollusks; particularly the family of the Unionidæ. The last one of this great series was published in 1876.

Dr. Lea twice visited Europe, making extensive journeys, and being received with enthusiasm by the most eminent men of science. The record of these receptions, and the conversations with the great men whose names are so often seen in books, so far as they are preserved from a very interesting chapter in the biography of Dr. Lea.

Great numbers of specimens, and a most voluminous correspondence were awaiting him upon his return, and the amount of scientific labor which he has performed has been prodigious, even for so long a life. And that his life has been long, it may be mentioned that in the war of 1812 he joined a military company, and thereby lost his birth-right among the Quakers. But so late as 1884, though in his 93rd, year, yet in good health and spirits, he received and entertained a company of about two hundred scientific gentlemen, in his summer house at Long Branch.

Dr. Lea has given his idea of what constitutes a species in the following words:

"A species must be considered as a primary established law, stamped with a persistent form, pertaining solely to itself, with the power of successfully reproducing the same form and no other."

Of a devout spirit, he recognizes in the wonderful works of nature, the wisdom and design of the Great Creator.

Dr. Lea's cabinet of shells, particularly of the fresh-water species, is exceedingly complete and valuable. Sometimes fifty specimens of a single species are arranged so as to exhibit all the varieties and peculiarities which the shell presents under different circumstances.

A carefully prepared biography of this eminent American naturalist by N. P. Scudder, together with an exhaustive catalogue and analysis of his writings, and a fine potrait of the old man, has recently been published by the United States government, under

the direction of the Smithsonian Institution. From this biography, most of the facts in this brief sketch have been taken.

That America has produced such a man, and that the government honors itself by publishing his biography is a matter for honest pride and congratulation, on the part both of the scientist and of the citizen. His hoary locks are a crown of glory not only to himself, but also to his country. (Dr. Lea's death, on Dec. 8, 1886; at his home in Philadelphia, has been announced since writing this article.)

Josiah Keep.

Mills Seminary, Cal. Dec. 6, 1886.

NEW CRETACEOUS FOSSILS.

In the present volume of *The West American Scientist*, pp. 8 and 21, we gave an account of the discovery of a new genus of Chamidæ, with the description given in bulletin No. 22, U. S. Geol. Survey, by Dr. C. A. White. In this number we give two other plates illustrating the same fossil, together with a plate giving the figures of the univalves referred to on page 11, for all of which we are indebted to Prof. Baird and Dr. White. We take the following descriptions by Dr. Charles A. White from the same publication.

Trochus (Oxystele) eurystomus, White.

Shell small, depressed-subturbinate; volutions about four in number, rounded, and, at the distol border, more or less distinctly appressed against the preceding volution; aperture comparatively large, and, in adult shells, the inner lip is appressed against the last volution as in callus covering of a portion of the base of the shell, but its margin being a little elevated, it forms, together with the thin outer lip, a continuous margin to the aperture. In immature shells the callus of the inner lip is not formed, and the margin of the aperture is therefore not then continuous. Surface marked by numerous sharply raised revolving, somewhat crenulated ridges, separated by grooves of similiar width. Height, 6^{mm}; greatest diameter of the last volution; 8^{mm}. Locality: Southern shore of Todos Santos Bay, Lower California.

Cerithium Pillingi, White.

Shell small; spire comparatively short; volutions four and five in number; each volution bearing four or five prominent longitudinal folds, which are usually so arranged upon the spire as to form continuous ridges along its whole length. These long ridges, together with the flattening of the sides of the volutions between them, give a distinctly angular aspect to the shell. Volutions

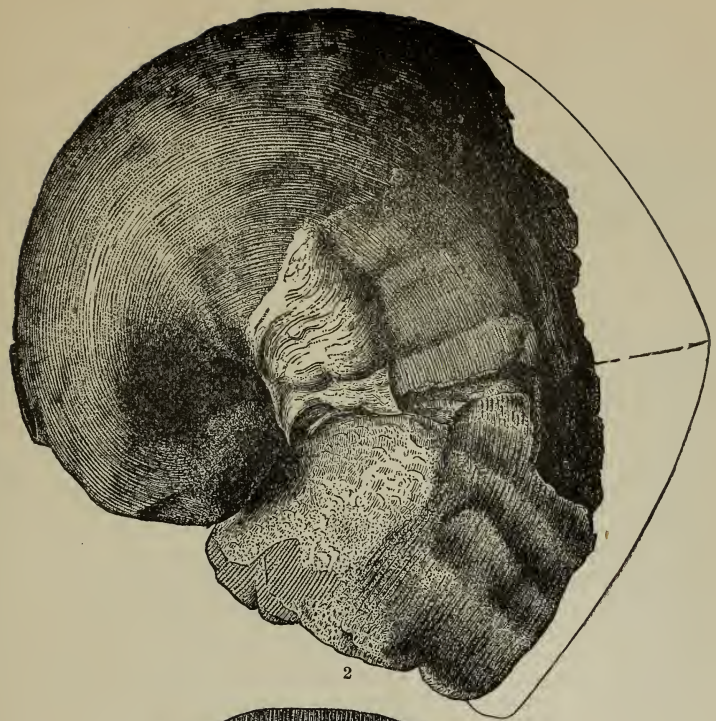
marked by numerous revolving crenulated or tuberculated coarse lines or slender ridges, and the anterior side of the last one is marked in a similiar manner; suture not readily distinguishable from the interspaces between the revolving ridges of the spire; aperture, when occuring between the longitudinal folds, comparatively small, beak short; canal narrow. Height of the largest example in the collection, 12^{mm}; greatest diameter of the last volution, 7^{mm}. In general aspect, this shell resembles C. sexangulatum from the Gossau formation of Europe, but it differs from that species in being proportionally shorter, in the character of its revolving ridges, and in having the spaces between the longitudinal folds upon the spire more flattened. The specific name is given in honor of Mr. J. C. Pilling, of the U. S. Geological survey. Locality: Shore of Todos Santos Bay, with the last.

Cerithium Totium Sanctorum, White.

Shell small, slender; sides of the spire straight or slightly concave; volutions eleven or twelve in number, not converse; each volution marked by four tuberculated revolving ridges, the anterior one being usually a little more prominent than the other three; at irregular and somewhat wide intervals upon the volutions there are moderately prominent longitudinal folds which are sometimes arranged approximately in rows along the spire, but they are as often scattered; suture impressed, its presence being indicated by a space between the revolving ridges which is a little wider than the other spaces; anterior side of the last volution marked by small revolving ridges, but they are crenulated and not tuberculate like those upon the sides of the spire; beak moderately small; canal narrow; length 20^{mm}; diameter of the last volution 7^{mm}; locality, shore of Todos Santos Bay, with the preceding.

Solarium Wallalense, White.

Shell of medium size, depressed; volutions about four in number, increasing somewhat rapidly in size, corinate at the periphery, broadly convex between that carina and the suture; umbilicus of medium size having an obtuse carina at its margin; the space between the peripheral and umbilical carinas is flattened and marked by numerous very small obliquely-radiating ridges, the inner surface of the umbilicus also marked by numerous very small radiating lines or ridges which are made crenulate by the presence of numerous revolving lines. The type specimen shows that the volutions of the spire also bore obliquely-crenulated markings, but it has been so much withered that they are nearly obliterated. Height about 17^{mm}; greatest diameter about 25^{mm}. The only example that has been obtained is quite imperfect, but



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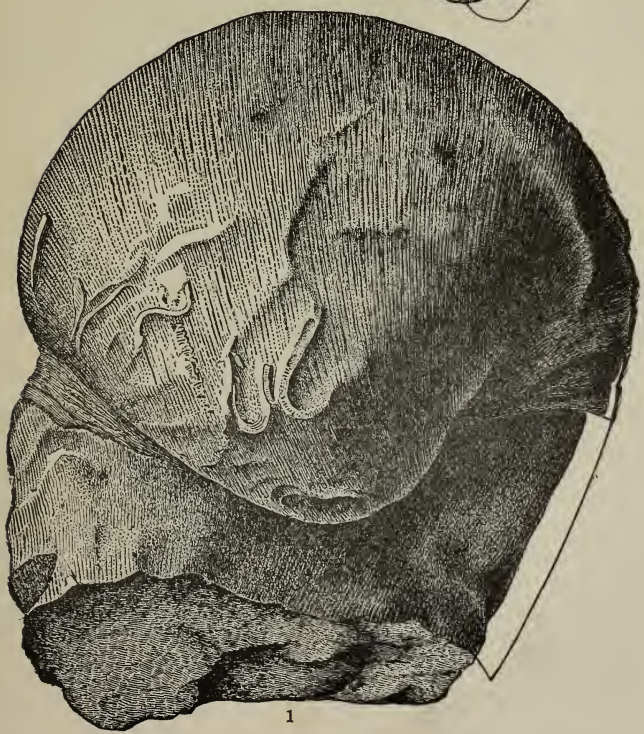

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IV. Coralliochama Orcutti, White.

it is described and named for the purpose of presenting the fauna of the Wallala Group as fully as practicable. Locality, near the town of Wallala, Mendocino County, California. Collected by Dr. G. F. Becker.

NERITA CALIFORNIENSIS, WHITE.

[The above name was proposed by Dr. White for a small species obtained at Todos Santos Bay. The largest examples were only some 5 or 6^{mm} in diameter. No description was given.]

EXPLANATION OF PLATES—III. Fig. 1. Cardinal side of a partly grown specimen, natural size, of Coralliochama Orcutti. Fig. 2. Lateral view of the same example. Fig. 3. Interior view of a broken upper valve, showing the hinge. Fig. 4. A fragment of a lower valve, showing the cellular structure. Fig. 5. Another fragment showing the same structure. IV. Fig. 1. A fragment of a large example of Coralliochama Orcutti, showing the extreme convexity of the upper valve; natural size. Fig. 2. Lateral view of the same example. V. Fig. 1. Solarium Wallalense, lateral view, natural size. Fig. 2. Umbilical view of same example. Fig. 3. Cerithium Pillingi, lateral view, natural size and enlarged. Figs. 4, 5 and 6. Similar views of other examples of same. Fig. 7. Nerita Californiensis, lateral view, natural size and enlarged, showing original color-markings. Fig. 8. Similar views showing the aperture and inner lip. Figs. 9, 10 and 11. Trochus (Oxystele) euryostomus, different views, natural size and enlarged. Figs. 12 and 13. Cerithium totium-sanctorum, lateral view, natural size and enlarged.

A FRAIL AND BEAUTIFUL SHELL.

See what a lovely shell,
Small and pure as a pearl,
Lying close to my foot,
Frail, but a work divine,
Made so fairly well
With delicate spire and whorl,
How exquisitely minute,
A miracle of design!

* * * * * * *

The tiny cell is forlorn,
Void of the little living will
That made it stir on the shore,
Did he stand at the diamond door
Of his house in a rainbow frill?
Did he push when he was uncurled,
A golden foot or a fairy horn
Thro' his dim water-world?

Tennyson.

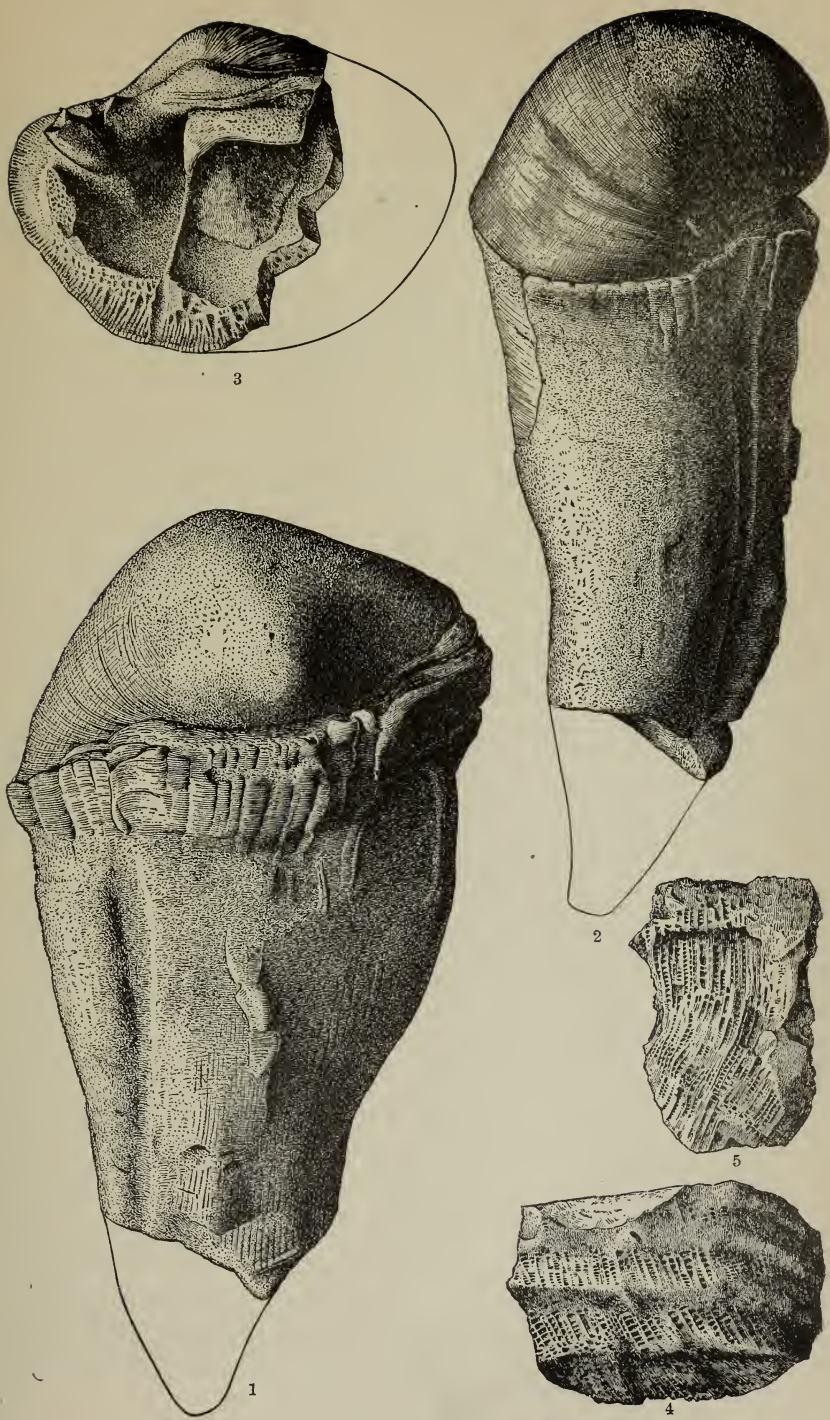
THE WESTERN GULL IN CAPTIVITY.

I wish to give an account of two odd pets which I secured on a recent collecting trip to the Farallone Islands, 23 miles from San Francisco Bay. They are two young Western Gulls (Larus occidentalis), now (Aug. 9. 1886) only about six weeks old, and the most comically interesting of all the pet birds or animals I ever owned.

I secured them when quite young, and their growth since then has been somewhat extraordinary. They are quite tame, and they run up to me when I approach them. in a really dangerous looking manner, with their great hungry-looking mouths stretched wide open; but their intentions are harmless, they are only hungry; and until I can satisfy their voracious appetites they continue to upbraid me uncessingly, with loud squawking cries which prove very appalling to all the other fowl in the yard. The cormorant has a wide-spread reputation for enormous voracity, but after watching these two young gulls devour piece after piece of raw beef with an appetite almost insatiable, I have arrived at the conclusion that for immensity of capacity and appetite the cormorant has a powerful rival in the gull. The natural food of these young gulls is small fish, which the parents carry to the nest, but in confinement I am told they will live on almost anything which is given to them. I have pampered the taste of the two birds in my possession, however. until they enjoy nothing but raw fresh meat. Their alimentary canal seems proof against almost anything, for one of them the other day, swallowed a large piece of a cup handle which lay in the yard, with no apparent inconvenience. They seem quite fond of fresh water, and when they have swallowed all the meat possible, they want a pan of water immediately, and dip their big bills into the sand in a very amusing way to show that they are thirsty and want their water at once.

I have no large place for them to swim in, but they delight to stand and wash themselves in a large pan filled with fresh water. The birds are very quick to catch pieces of meat thrown them, no matter what the distance may be, and fight over any piece which chances to fall to the ground. I notice that they begin to exercise their wings very much of late, performing a sort of flying dance around among the astonished hens, rising about three feet above the ground, and as I have seen them holding animated conferences they may be meditating escape. I shall have to clip their long wings so as to avoid the possibility of their sudden flight to join their friends and relatives on the Farallones.

The gull is a very intelligent bird and knows his friends and his enemies well. When I first placed this pair among the chickens they were the pitiful victims of a great deal of abuse from all the



III Coralliochama Orcutti, White

old hens of the poultry yard, who took advantage of their tender age and unprotected condition to abuse them terribly; but now the tables are turned, and woe betide the imprudent hen which dares to come near these haughty young natives of the Pacific Ocean.

I hope to keep the two birds to observe the change of plumage as they approach the age of the adult, in which case I seriously think it advisable that I purchase a meat shop---just for the sake of economy.—*H. R. Taylor, in Ornithologist and Oologist.*

THE WESTERN SPECIES OF ECHINOCYSTIS.

That these plants, commonly called Big Root and best known to botanists as species of Megarrhiza constitute a genus distinct from Echinocystis is a doctrine which has nowhere been seriously defended. Dr. Kellogg of San Francisco was first to suggest for them generic rank, publishing early in the year 1854 his *Mara muricata. But only a year afterwards he brought out a second species not as Mara but as Echinocystis.

In the sixth volume of Pacific Railroad Reports, published in 1857, in a catalogue of the plants of Williamson's Expedition, the name Megarrhiza for the first appears in print; but no generic or specific character is given, or any synonym or citation of a description; but Dr. Torrey's name being appended as authority for each of the two species indicates that he, at that time, was entertaining the thought of founding a genus upon these plants; an opinion which, it is quite certain, he very soon afterwards relinquished; for only three or four years later, in preparing his elaborate report upon the Botany of the Wilkes' Exploring Expedition, he referred the same plants to Echinocystis. As late as 1875, two years or more after Dr. Torrey's death, Mr. Sereno Watson, in the Proceedings of the American Academy gives what is indexed as a Revision of Megarrhiza; but this paper, so far from being the systematic revision of a previously published genus, is the very first appearance of it as characterized. The appending of Dr. Torrey's name as authority for Megarrhiza as a genus was no doubt kindly and reverently meant. Still, the advisability, the lawfulness even, of bringing an author's name, posthumously, to the support of a genus which he in his life time declined to publish, and declined because he doubted, and which he at length cast out of his mind altogether, is to be questioned.

* Erroneously written Marah by Dr. Kellogg who, as if writing an English name, follows the anglicised spelling of it given in the King James version of the Sacred Scriptures. But the final aspirate in such Hebrew words is always omitted in Latin writing; and this not only because its presence is an obstacle to the declension of a name; it does not, even in Hebrew represent any sound whatever and therefore ought to be omitted in English as well as Latin.

Our western plants differ from the Eastern type of Echinocystis only in their more turgid seeds, hypogæous cotyledous and perennial tuberous roots. In the seeds there is displayed every variation between the obovate and orbicular, and from nearly globose to very much flattened. Eminent botanists who have given special attention to the Cucurbitaceæ agree in the opinion that our Pacific Coast plants in question form hardly a well characterized section of Echinocystis. In the natural orders most nearly allied, Cactaceæ and Loasaceæ for example, much wider differences in the character of seeds are allowed in a genus. To take the case of Mentzelia, the diversity of the seeds, all the way from nearly shapeless to thin flat and winged on the one hand, and to almost exactly cubical on the other, is manifold greater than what we shall have in Echinocystis as here allowed; and as for the nature of the roots, whether tuberous or fibrous, perennial or annual, in what orders does one ever take such characters into consideration for a moment, when trying to determine the limits of a genus? The species of this western group are now become quite respectably numerous, and arrange themselves somewhat naturally as follows.

E FABACEA, Naudin, Ann. Sci. Nat. 4 ser. XII and XVI: Megarrhiza Californica, Torr. Pac. R. Rep. VI, fide S. Watson, Bot. Cal. i. 241.

E. MACROCARPA, Greene, Bull. Cal. Acad. i. 188.

E. GILENSIS, Greene, l. c. 189.

E. OREGANA, Cogniaux, Diag. Cucurb. Nouv. ii. 87 and 97.

E. MARA. Mara muricata, Kellogg, Proc. Cal. Acad. i. 38: Megarrhiza Mara, Watson, l. c.

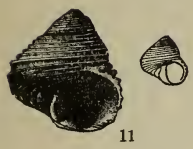
E. GUADALUPENSIS. Greene, l. c. 223;

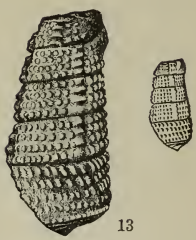
Megarhiza Guadalupensis. Watson, l. c. 242.

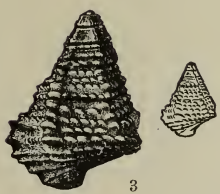
The seeds of this are hardly "sub-globose," they are, on the contrary, more compressed than in any other one of the western species. They are round-ovoid, more than an inch long, nearly an inch broad and less than a half inch in thickness. This plant is abundant on the island of Santa Cruz, and is distinguishable from E. macrocarpa, which grows there along with it, by the seeds chiefly; and the difference between them, both as to the number of the seeds, and their size and form, is very clear.

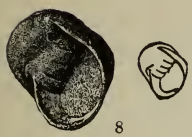
E. MURICATA, Kellogg, l. c. 57; Megarrhiza muricata, Watson, l. c.

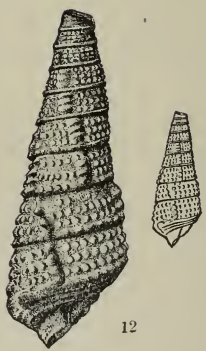
Although this is one of the oldest species it remains one of the rarest. I met with it myself, for the first time, during the past season on the tops of the mountains, back of Vacaville. The whole plant is beautifully glaucous, the fruit of the size of a small lemon and of the same yellow color. The soft spines are rather numerous, in my specimens, and the seeds four, whereas according to the description they are two only. It is barely possible we are including two species under this name. *Prof. E. L. Greene.*

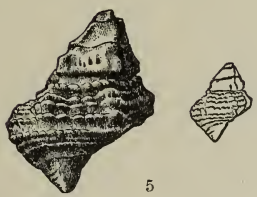


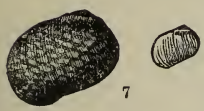


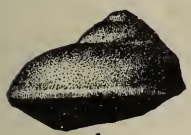












V. New Cretaceous Fossils

A BEE'S STING A USEFUL TOOL.

A new champion has arisen to defend the honey bee from the obloquy under which it has always rested. Mr. Wm. F. Clarke of Canada, claims to have discovered, from repeated observations, that the most important function of the bee's sting is not stinging. In a recent article he says:

"My observations and reflections have convinced me that the most important office of the bee's sting is that which is performed in doing the artistic cell work, capping the comb, and infusing the formic acid by means of which honey receives its keeping qualities. As I said at Detroit, the sting is really a skillfully contrived little trowel, with which the bee finishes off and caps the cells when they are filled brim full of honey. This explains why honey extracted before it is capped over does n ot keep well. The formic acid has not been injected into it. This is done in the very act of putting the last touches on the cell work. As the little pliant trowel is worked to and fro with such dexterity, the darts, of which there are two, pierce the plastic cell surface and leave the nectar beneath its tiny drops of the fluid which makes it keep well. This is the 'art preservative' of honey. A most wonderful provision of nature, truly! Herein we see that the sting and the poison-bag, with which so many of us would like to dispense, are essential to the storage of our coveted product, and that without them the beautiful comb honey of commerce would be a thing unknown.

If these things are so, how mistaken those people are who suppose that a bee is, like the Prince of Evil, always going about prowling in search of a victim. The fact is that the bee attends to its own business very diligently, and has no time to waste in unnecessary quarrels. A bee is like a farmer working with a fork in his hay field. He is fully occupied and very busy. If molested or meddled with, he will be very apt to defend himself with the implement he is working with. This is what the bee does; and man, by means of his knowledge of the nature and habits of this wondrous little insect, is enabled, in most cases, to ward off or evade attack. It is a proof of their natural quietness, industry and peaceableness that so many thousands of them will go through a summer of ceaseless activity close to your dwelling-house, and perhaps not half a dozen stings be inflicted during a whole season." *Scientific American.*

The West Indian Birch is said to be the weakest; and the nutmeg hickory of Arkansas, the strongest wood. The lightest and most brittle is the blue wood of Texas, and the tamarack, the most elastic. The recent scientific examination of woods is of considerable economic value.

AN INSECTIVOROUS PLANT.

A writer in the Popular Science News says that when microscopically examined, the Silene stems and flowers are found covered with hair-glands, which thickly beset the calyx and upper stems. The glands, on the distal ends of the hairs, are filled with a greenish, yellowish or clear juice of very viscid character. The little round vesicles or glands are inclosed in an exceedingly thin membrane that is easily broken by the touch of insect feet, body and wings. The sticky liquid oozes out, and fastens myriads of gnats and flies in its fatal embrace. Insect feet can be seen toiling in vain to escape; the liquid adheres, is extended in long threads, and, by its elasticity, draws back the unwilling feet lifted to escape. After a while the liquid evaporates to a hard gum; the insectivorous plant absorbes the juices of its prisoners' bodies, and appropriates them to itself.

DIMINUTIVE MAIL MATTER.

The postal service at Liverpool, England, recently had an experience which, if often repeated, would prove the reverse of amusing. Some one whose ingenuity or economy was searching for new fields, wrote a message of twenty-six words on the back of a 2-cent stamp, which was duly posted and delivered. The success led to a second experiment and then a third. But, on the last occasion, a 1-cent stamp was chosen, and was accordingly held as an insufficiently prepaid letter.

NECROLOGY.

M. Bonley, president of the French Academy of Science, died November 20, 1886.

M. Rabuteau, for twenty years a member of the French Biological Society, is deceased.

Captain Mangin, the inventor of a system of optical telegraphy. is dead of apoplexy at the age of 45 years.

Dr. Thomas Andrews, F. R. S., the well-known professor of chemistry in Queen's College, Belfast, died lately at the age of 71 years.

Carl Oscar Hamnstrom, a Swedish botanist, died on July 5, 1886, at Hessleholm, Sweden, aged 70.

Florida is following Louisiana in the attempt to make money out of the Ricinus communis. A firm in that State is preparing 320 acres to be planted in castor beans, and next year an oil mill will be erected.

CORRESPONDENCE.

TALLY HO RANCH, Cal., Oct. 23, 1886.

I send you a postal note for a year's subscription to THE WEST AMERICAN SCIENTIST. I will also endeavor to get some subscribers from this valley but I fear I will not be able to get very many as I only know of a few people who would like to subscribe, but I am sure that they, having once read the paper will become regular subscribers to the same, and will cheerfully pay a dollar's subscription each, as that is cheap for so much instructive literary matter. I should like to know if you could possibly give me any information whatever concerning Santa Cruz, Santa Catalina and San Clemente Islands, which I intend to visit in a small schooner from Santa Barbara next spring, and to camp on each of them for one month. Who are the owners or occupiers of each of them, and how many inhabitants do they each usually have? Santa Cruz, I believe, has a permanent population of at least thirty men, and is well wooded with pine, cypress and oak, and has an abundant supply of good fresh water on it. Could you tell me the approximate height (in feet) of the highest peak (Mount Diablo) on Santa Cruz, and also the height of the highest peaks of Santa Catalina and San Clemente, and also the extreme length and width (in miles) of Santa Catalina and San Clemente? I suppose the continent is at all times plainly visible from each of these islands, and that Santa Cruz, Ana Capa and San Nicolas are also visible on any clear day from off any of the highest peaks of Santa Catalina. How is the fresh water supply on Santa Catalina and San Clemente? I suppose these two islands have a considerable number of live oak trees on them and also plenty of brushwood, bushes and good bunch grass. I hear that each of these three islands have thousands of sheep on them, and that wild hogs are plentiful on Santa Cruz, and that Santa Catalina has numerous wild goats and rattle-snakes on it. Those deep canyons and ravines that have been cut out of the side of the mountain at the south-east end of San Clemente must be a grand sight to behold; have they any running water along their bottoms? Do you know if any photographic views or drawings have ever been made of any portions of these islands? I see by your paper that E. L. Greene has been botanizing on some of these islands; could you not prevail upon him to send his impressions and observations in natural history during his trip to your paper? I am sure it would be read with extreme interest by many persons, as the Santa Barbara Islands and the Farallones are the only islands that lie off the entire coast of California. Will you please mention to me any books that have ever been published concerning Lower California with their respective prices?

Yours very sincerely,

Almyer Montgomerie.

[Mr. Montgomerie's letter was answered in part in our last issue by Prof. E. L. Green in his valuable article on Santa Cruz Island. Readers who can answer any of the remaining questions are cordially invited to do so. Some of our older naturalists, we hope, will contribute of their own experiences on these islands. An interesting series of articles is being contributed to the *Botanical Gazette* by Wm. S. Lyon on 'The Flora of our South-western Archipelago,' and we may hope for something from his pen.

The literature on Lower California is widely scattered through expensive reports of Government expeditions, the proceedings of learned societies and similar publications. Much has been given in the publications of the Calif. Acad. of Sci., even the most recent of which, we are informed, can be had 'neither for love nor money.' 'A Sketch of the Settlement and Exploration of Lower California,' by J. Ross Bronwe, 1869, gives 177 pages of more or less reliable facts, and can be had of D. Appleton & Co., N. Y., while a pamphlet has recently been issued by the Int. Co of Mexico (whose advertisement appears in this number), accompanied with a very valuable map, correct except in the calling of the desert portions 'farming' or 'grazing land,' for which a land company is perhaps excusable. ED.]

CHICO, Cal., Nov. 26, 1886.

With the bustle of Thanksgiving feasts, rides, balloon ascensions, etc., etc., it is difficult to fix the thoughts long enough to write. This place, which is charming always, presents so much to see and do, that I hardly know where to begin. Miss S. sends papers, etc., with glowing accounts of Coronado Beach, but it does not attract me. I prefer desert wastes to boulevard and avenue, and would rather sit in the shade of Ephedra than Citrus —but then it is well all do not feel alike on such matters.

I suppose we will return to Colton to settle in winter quarters. On many accounts Colton seems as desirable as any, except its distance from the sea. * * * If we do not do much work here, it is to me the garden spot of California. Yours truly,

C. C. P.

PROCEEDINGS OF SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY.—November 10, 1886 A number of unusually fine examples of lacunæ in quartz crystals, containing fluid and bubbles, were shown by J. Z. Davis.

Dr. J. H. Stallard drew attention to the enormous development of the biliary ducts in juandice, and to other changes of structure in the liver incidental to that disease. In illustration of the subject, a number of slides were shown, in which the

ducts, crowded with biliary resin, the excessive development of fat cells, and other morbid conditions, were clearly shown.

Mr. Wickson stated that he had recently found insects in large numbers on some laurel trees in the Experimental Gardens at the State University. At first sight they appeared to belong to the Aphidæ, but a closer inspection showed them to be neuropterous insects of the genus Psocus, which embraces some sixty species. They are very active in the larval and pupal stages, as well as in the perfect form. They live in groups, usually on the under side of the leaves. A microscopical examination shows them to have free mouth-parts. The compound eyes are exquisitely beautiful and many other points in their anatomy are of great interest. From the fact that the laurel leaves upon which these little creatures have made their appearance in such numbers, are very badly infested with scale, Mr. Wickson thinks it quite possible that these species of Psocus may be a natural enemy of the scale insect, finding its food in the eggs or young of the latter. Experiments are now being carried on with a view to testing the correctness of this conjecture.

November 24th.—Mr. Wickson stated that recent experiments had shown quite conclusively that the recently-observed insects of the genus Psocus, found on scale-infested laurel trees, would not attack the scale insect itself.

Specimens of an Australian Polyzoan, Bicellaria ciliata, were shown by Mr. Howard, who also exhibited an alga (Trichodesmium, Sp.) found floating in immense quantities in the Pacific. The alga consists of red-like filaments transversely striated, and of a light-olive green color. The average length and diameter are respectfully .015 and .0003 of an inch. One peculiarity of growth is that the filaments arrange themselves in bundles of about twenty-five to fifty. This minute plant forms a considerable part of the food of the right whale, and is in fact known to many mariners as "whale-feed." The process of spore formation does not seem to have been observed as yet.

Some fine examples of insects preserved in amber and in fossil copal were shown by Prof. Hanks.

Dr. Montgomery exhibited a number of interesting slides, illustrative of the minute structure of the eye. Alum-carmine had been used as the staining agent, and the nuclei of the various cells were thereby very clearly defined.

A 'Holman Life Slide,' containing an unusually rich collection of pond organisms, was shown by Mr. Payzant. Germinating gonidia of Vaucheria, many Desmids and other algæ, Arcellæ, Amæbæ and other Rhizopods and innumerable infusoria, were observed. Noteworthy among the latter were several examples of a species belonging to the beautiful genus Epistylis. As the individuals each showed a peculiar band or collar just below the

posterior margin—a characteristic apparently hitherto undescribed —the little animals are quite probably specifically new.

Dr. Ferrer promised a demonstration, in the near future, with the new Zeiss photomicrographic apparatus recently received, and the meeting adjourned.

A. H. Breckenfeld, Rec. Secretary.

California Academy of Sciences. — December 6, 1886. Numerous donations to the museum were made, among them a stone axe used by the natives of Alaska in making canoes. Prof. Davidson stated that he failed to observe any shower of meteors, or even a single meteor, on the nights of November 13 and 14; in the constellation of 'Leo,' showers of meteors were said to be due at that time, after a lapse of 33⅓ years. Prof. S. B. Christy read a paper on 'Rustless Iron,' and its application to architecture and engineering.

EDITORIAL

Another new year has arrived, and we wish it may prove a happy one to our readers. The rich table of contents this month renders further remarks under this head unnecessary, except as a matter of business we would state that each subscriber will receive this journal for the present until ordered discontinued and all arrearages are paid. Any subscriber failing to receive numbers which are due, will greatly oblige by promptly reporting to us, when they will be replaced. A cross on the cover or wrapper of the paper will indicate that your subscription is now due.

NOTES AND NEWS.

A citizen's association, for improving and beautifying San Diego, was recently organized in this city. Tree-planting, the improvement of the City park, and similiar undertakings are its principal objects.

A population of 12,000 is now claimed for San Diego City, and 35,000 for the county.

Mr. James Stevenson, the executive officer of the U. S. Geological Survey, urges in a recent report the commencement at once of work on the Southern California Geological Survey. The need of systematic geological, topographical and scientific researches in this county is seen by every observing person, and the results of such work, properly carried out, would be invaluable to the future development of this portion of the State.

Capt. L. E. Frazer, who has charge of the Lick Observatory on Mount Hamilton, Cal., was in the city recently. He hopes to have his telescope ready for observation by the New Year.

Lieut. Thos. L. Casey made a short collecting trip to Fort Yuma, in search of coleoptera, in December.

The fossil skeleton of a whale over thirty feet in length, has been discovered in Monterey county at over 3,300 feet above the sea.

A postal left Albany, N. Y. on the first of January, and traveled around the world, returning to Albany, in eighty-nine days.

Two new species of fungi, collected by Dr. H. W. Harkness, of the recently described genus, Keller mannia are characterized in the October No. of the Journal of mycology.

A new postal card is to be used by the United States, as soon as the stock of the present one is exhausted.

The Photographic News states that Abney has succeeded in preparing plates which are sensitive to the rays lying beyond the red end of the spectrum, the dark heat rays, and with such plates used with a rock-salt lens there should be a possibility of photographing bodies which possess a high temperature, although that temperature may be far below that needed to render them self-luminous.

A London physician, who for six months tested Dr. Jaeger's plan of wearing nothing but wool, day or night, says the result has been a complete immunity from colds and a marked increase in capacity for work. Instead of alternate feelings of heat and cold there has been a uniform and most agreeable glow of warmth. —[Australian Journal of Pharmacy.

The Cincinnati Medical News says that Dr. Koch tells the following story about the origin of his celebrated cultivative experiments. He had been, like many others, trying various kinds of decoctions and infusions, when, walking along the street one day, he noticed a potato covered with a fungus growth, and it occured to him that disease germs might thrive equally well on the same nutriment. This was the beginning of his wonderful series of dry cultivated experiments, and thus Professor Whittaker expressed it at New Orleans: "The potato was to Koch what the apple was to Newton."

Natural gas has been discovered in paying quantities in nineteen states and territories of the Union.

A remarkable tree is mentioned in the Gardeners' Chronicle, which is said by Mr. W. T. Thiselton Dyer to be absolutely indestructible by fire, it surviving in large districts where the dry pastures and bush are burnt twice a year, and everything except this tree is destroyed. It would be interesting to learn to what

cause this immunity is due. The tree is a species of Rhopala, of a contorted appearance, and growing to about twenty feet in height. A microscopical examination of the tissue would be interesting.

LITERATURE.

Publications received:—Dr. Thomas Taylor's reply to *Science*, relating to the crystals of butter, animal fats and oleomargarine. With colored plate. From the author, microscopist, U. S. Dept. of Agriculture.

Biennial report of the president of the University of California, 1886. From the University.

On Tetraodon setosus, a new species allied to T. meleagris, Lacep. By Rosa Smith. Extract from Bull. No. 6, Calif. Acad. Sci. From the author.

On the occurence of a new species of Rhinoptera (R. Encenadae) in Todos Santos Bay, Lower California. By Rosa Smith. Extract from Proc. U. S. National Museum. From the author.

Revised list of rare American silver and copper coins. By E. T. Gambs, coin and stamp dealer, 234 Montgomery Street, San Francisco. From the author.

Among the journals received, we would mention the second monthly number of *Science Series*, a weekly magazine of natural science, containing 'Parasites and their development.' 'The diamond,' 'Alexander Von Humboldt' and 'Aquariums, how to make and stock.'

Le Naturaliste Canadien, of Cap Rouge (Province of Quebec, Canada) and the *Business Educator*, of Owen Sound, Ont., are welcome additions to our exchange list.

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THE West American Scientist.

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Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - EDITOR.

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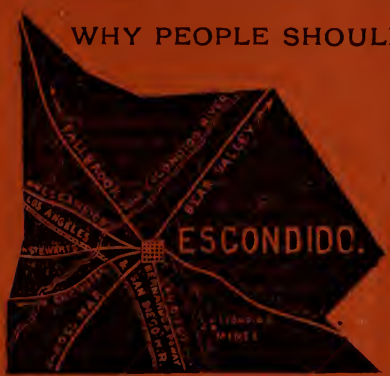

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THE WEST AMERICAN SCIENTIST.

VOL. III. FEBRUARY, 1887. No. 22

A LEMONADE AND SUGAR TREE.

A peculiar shrub, related to the sumacs, is found growing abundantly in the vicinity of San Diego, and is known to botanists as Rhus integrifolia. It grows but a foot or two in height along the ocean beach, where it forms close, impenetrable oval masses, offering the least obstruction possible to the sea breezes; but, in more sheltered places, it often assumes the proportions of a small tree, especially further south, on the shores of Todos Santos Bay, Lower California, where the larger ones frequently attain a height of twenty or thirty feet and a diameter of some twenty inches.

The wood is of a rich dark color, and very hard, and in consequence has been called by the very indefinite name, 'mountain mahogany,' applied to every native wood of a deep hue. This shrub is not, however, a native of the mountains, being confined to the lower lands near the sea. Some experiments are being made with its leaves and bark, which are believed to contain valuable tannin.

As many botanists, and all who are acquainted with this shrub, are well aware, the berries are extremely sour, and covered with a white oily substance even more tart than the deep reddish pulp surrounding the large seed. The berries are frequently gathered and used in the preparation of a cooling, refreshing drink, equal to lemonade, by those acquainted with them, and I have never heard of any injurious results.

An old Spanish lady related to me how they used to gather and dry the berries, roast and grind them as we would coffee berries, and store the product for use when they wanted an acid drink, and the fresh fruit was not to be had. She spoke of it as 'one of the native fruits of the land,' useful in the making of lemonade.

Capt. German Senter, residing at Sauzal de Comacho, on Todas Santos Bay, Lower California, informed me he had observed Indian squaws bring in a quart dish full of the berries and eat them down clear, because of their supposed medicinal qualities.

Rhus lentii, of Cerros Island, off the coast of Lower California, is said to fairly drip with the sour juice of its larger berries, and other species of Rhus found in California (R. aromitica, and its varieties, for instance), produce an abundance of fruit with pulp of a pleasant tart.

In the hills and higher mountains, Rhus integrifolia is supplanted by another species, R. ovata, with larger, smoother leaves and smaller fruit. The two were for many years confounded with each other; in fact, Prof. Watson writes me that Dr. Torrey even figured R. ovata for the Nuttallian species, notwithstanding the very distinct characters of each. The fruit of R. ovata is much smaller, but similar in shape, and possesses the acidity common to this section of the genus. The fruit seems equally greasy with that of R. integrifolia.

On one of our botanical trips into the mountains of the northern part of Lower California, a large stock owner, who had resided in those mountains for many years, related to H. C. Orcutt and the writer, how the Indians formerly resided in great numbers all through the country, and of their rapid decrease, until now there were but a few dozen left where thousands had been. Among other interesting details, he related how the Indians obtained their main supply of sugar from a peculiar shrub common in these mountains. Upon his pointing out a bush, we quickly recognized the Rhus ovata, and became rather incredulous of the possibility of procuring sugar from berries that we knew by experience were sour.

However, we decided to test the truth of the story, and soon had an opportunity upon coming to a large cluster of the low shrub, loaded with an abundance of fruit. It is proper to state here that the climate of these mountains is very warm and dry in the summer, and this trip was made during the month of July. We found the berries as tart as ever, but that the white oily substance had hardened into a thin crust which had cracked and curled into a multitude of thin waxy curls of a delicate white. These were easily shaken from the fleshy part of the berries upon a sheet of paper or into the hand, and with the time and patience of an Indian we might have secured a liberal supply of sugar for use.

This curious substance when rolled together in the hand would form little balls of about the same consistency as the whitest of bees' wax; upon tasting, it was found to be as sweet and delicious in flavor as the best of refined sugar.

This must have proved a great delicacy to the hordes of Indians that in former years gathered the pinyones, the tecos palm fruit), and the manzanita berries; and, this graceful little shrub, with its clusters of pink-white blossoms, was to them both a source of lemonade and of 'something to put in it.' But neither

they nor their descendants longer reap the bountiful harvests prepared for them by the hand of nature.—long since having one by one, made the little mounds throughout the border of the valley, marked only by little groups of cholla cactus around the squirrels' holes.

C. R. Orcutt.

EMINENT NATURALISTS.—V.

HUGH MILLER.

On the 10th of October, 1802, there was born at Cromarty Scotland, one whose name will be remembered, and whose writings will be extensively read, as long as English literature shall remain.

The little Hugh Miller, for such was the name of this sturdy Scotch urchin, early lost his father, who was a sea-faring man, and whose little vessel was overwhelmed during a storm off the Scottish coast.

Kind friends, however, watched over his early life and directed the course of his education. He attended various schools, from which, according to his own testimony, the most important acquisition that he obtained was the ability to read. He had a fine memory, but his other talents did not seem remarkable, and he was often at the foot of the class.

But the ability to read opened to him a boundless field, full of treasures, and he eagerly gathered in whatever he could find from a great variety of authors. Books of adventure, English classics, and the stories of martyrs were read by this Scotch boy, and in course of time he began to attract attention. It was suggested that he should study for the ministry, but he felt that he was not called to the pulpit, and he chose for himself the trade of a stonemason, and was set to work in a quarry of old red sandstone. Very delightfully has he told the story of his first day's labor, of the interesting things which came to his notice as the day wore on, and of the exalted feeling he possessed at nightfall, when he reviewed the work of the day, and realized that he had himself assisted, by honest toil, in preparing the stone for some useful building; in short, he perceived the dignity of labor, and felt ennobled thereby. What a worthy example for every young man who is inclined to feel an aversion to manual labor, and to think that to work with one's hands, if not positively degrading, is quite far from being anything to feel proud of. Not so with Hugh Miller, however; he knew that every well-hewn block of stone reflected honor upon the one who wielded the hammer and held the chisel; and while he rejoiced in this feeling, he was led to de-

velop other powers and talents, and not to confine his whole ambition to the one aim of being a skillful worker in stone. And in this he gained a second point, which should not be overlooked by those who are placed in similar circumstances.

As he worked in the quarry, and saw the thick layers of sandstone lifted from the beds beneath, he was surprised to find the whole surface ridged and furrowed like a bank of sand that had been left by the tide an hour before. But what had become of the waves that had thus fretted this solid rock, or of what element had they been composed? With these strange questions ended his first day of work as a quarryman, and for fifteen years he united the labor of his hands with the activity of his mind.

As he studied the problems which the leaves of the great stone book brought to his notice, the solutions began to dawn upon his mind. The strange ripple marks became the plain records of a time when the ledge on which he was working formed part of a sandy beach on the margin of a vast ocean. The strange remains which were sometimes brought to light as the blocks of sandstone were split asunder, were reconstructed by his intellectual power, and made to stand forth as the relics of those armor-clad, wing-finned fishes of the Devonian age.

His studies and investigations began to tell, and it became an honor to be associated with the learned stone-mason, who could say so much and write so well on these puzzling problems of geology.

"The stone that is fit for the wall will not lie long in the street."

His devout but determined religious nature, joined with his skill and elegance in writing, caused him to be selected by the Scotch Presbyterians, as their champion in their struggles against an established Episcopal form of worship, and he was made editor of the "Witness," their newspaper organ. This office he filled with great credit for many years, but as time passed he yielded to his old passion for science, and spent the last years of his life as a discoverer, a lecturer, and author. Among his most celebrated works may be mentioned "Old Red Sandstone," "Footprints of the Creator," "My Schools and Schoolmasters," and "The Testimony of the Rocks."

His style is pure, flowing and entertaining, and he invests with a charm every subject which he touches. Not only could he do battle for his religious convictions, and by his rugged Scotch sense and vigorous style discuss so effectively the stern problems of the day, but also, as has been said by another, even 'the fossil remains seem in his glowing pages to live and flourish, to fly, swim, or gambol, or to shoot up in vegetative profusion and splendor, as in the primal dawn of creation!"

By his vivid imagination we are carried far back into the past, when a continuous ocean spread over the place now occupied by

the Britis-h Islands, and at its bottom and along the shores of the rising land, the sand and pebbles were rolled and ground and thrown into the wavy forms which filled him with surprise on that first day of work in the quarry.

He repeoples these seas with the grotesque fish, whose fossil remains he discovered, so abundantly. Still later, and gigantic animals rule the land which is now the seat of civilization. The clumsy rhinoceros forces his way through swampy thickets, gigantic bears and hyenas prowl over the land; masters of all, troops of elephants wander over the island; yet all die, leaving those traces which enable us to restore in imagination the scenes of distant eras, where now populous cities are full of the hum of industry.

While writing "The Testimony of the Rocks," his mind became unbalanced on account of excessive study, and in a fit of horrible delirium he took his own life, on the night of December 23, 1856, but a day or two after he had finished the last page. His native country, the commonwealth of science, and the civilized world generally, mourned his untimely death. But in his works, particularly in his last, in which he calls the very stones to witness to the truth of God's written revelation, he lives, and he will continue to live, until the rocks themselves shall melt with fervent heat, according to that same word.

The Testimony of the Rocks!

Into the high court of truth, at His call, we see these venerable witnesses take up their march. Each, in turn, answers its call, and presents to the human reason, which sits as judge, its silent, deliberate, infallible testimony. Hoary with the lapse of countless centuries, the first witness takes us far back towards that mysterious beginning when "God created the heaven and earth." It ceases; and another shows the record of the voice of God, bidding the waters bring forth life. Again and again He speaks; and the records of every new creation are written upon tables of stone, and for what? Hugh Miller helped to answer this great question, and does not his answer commend itself to our reason? To reveal to man, his Maker. *Josiah Keep.*

THE COAST FOX.

Next to Santa Rosa, Santa Cruz is the largest of the group of islands off the coast of California. It is situated about 300 miles south of San Francisco, and lies nearly 25 miles off shore. The island is about 23 miles in length, and in its widest part, perhaps seven miles broad. Santa Cruz is owned by a stock company, and is employed as a sheep ranch, about 25,000 head being kept there.

In general character the island is mountainous, the highest peaks being about 2,800 feet above the sea. Between two long ridges, extending nearly the length of the island, is a narrow but comparatively level valley, where stands the ranch-house and its adjoining sheds—the only buildings on the island. Along the shore are lines of lofty cliffs, with occasional coves or harbors which form the extremities of canyons running up the sides of the mountains.

In winter Santa Cruz is covered with grass and flowers, and there is plenty of water in the canyons, but in summer everything becomes dry, and the streams shrink to mere rivulets, or disappear altogether.

A volume might easily be filled with an account of the curious birds and animals upon the islands. It is the purpose of the present sketch to describe the habits of one species which is not very generally known—the coast fox, Vulpes littoralis of Baird.

The coast fox is found only upon the Santa Barbara islands, and seems to be entirely distinct from the fox upon the mainland. Upon Santa Cruz it is very common; I have often seen a dozen in a morning's walk. The most noticeable peculiarity of the coast fox is its diminutive size. Full grown individuals measure only about thirty inches in length, including the tail. The coloration is as follows: above, including the upper half of the tail, silver gray; beneath, including the lower half of the tail, reddish fawn color; chin and throat, pure white; forehead and a spot at the corner of the mouth, dusky brown; a dark stripe along the tail.

As Santa Cruz is rarely visited, the foxes have become wonderfully tame. While I was camping out upon the island during the past summer (1886), the foxes soon learned to come around camp about dinner time, to secure scraps of meat and fish, which were thrown to them by my companions and myself. Our camp was in a canyon, where the stream had washed out a deep channel for itself in winter, and diminishing in summer, had left a convenient place beneath the overhanging banks. The foxes would approach quite boldly to the very edge of these banks—within a few feet of our heads—and carry off whatever we left for them Nor were their incursions entirely confined to legitimate spoils. Any small article, edible or not, which we left lying about camp in the evening, was apt to disappear in the night,—gloves, stockings, handkerchiefs, sponges, soap, even a pocket of fish-hooks, were thus mysteriously spirited away. In general, however, the missing articles were discovered not far from camp, lying where the foxes had dropped them, but some of them we never saw again.

As we saw the foxes every day, we soon learned to distinguish them by their individual peculiarities, and even named some of our most regular visitors. 'Dick,' 'Jenny,' 'Pete,' and 'Uncle Joe' came nearly every afternoon; sometimes all four

would be eating together. They were especially fond of fish, whether raw or cooked, but did not refuse corned beef, ham, or bacon They even ate ship's biscuit, and "Dick" was once surreptitiously licking the grease from a saucepan, but their favorite delicacy was spoilt blackberry jam. We had brought over a can of this preserve, which upon examination proved unfit for use, so we abandoned it to the foxes. In two days the can was as clean as the most exacting housewife could desire.

On going down to the beach one day, we found it literally covered with hundreds and thousands of little fish, about the size of sardines, some dead, and others still alive. They had evidently been driven into our cove by a school of big bass, and were being cast up by the surf and left by the receding tide. We picked up about 850—weighing eleven pounds in all—and took them up to camp. We soon found that we had a good many more than we could eat, and we gave the foxes a treat. They were very much excited and after devouring as many as they could, proceeded to carry off the rest to their hiding places among the rocks and bushes. They carried them, of course, in their mouths, sometimes taking five or six at once. That night we could see many dusky forms roaming up and down the beach. It seemed as if all the foxes in the canyon were come down to take advantage of the unwonted opportunity.

The foxes did not often quarrel over their food, and even when they did, their only demonstrations of anger were muttered growls and hisses. On the other hand, they were apparently of very affectionate and playful dispositions, chasing each other in sport, and licking one another like kittens. Indeed, their actions and appearance, strange as it may seem, reminded us far oftener of cats than of dogs. They had an eminently feline gait in walking and running—gliding noiselessly and stealthily through the underbrush, or darting with remarkable agility up the precipitous hillsides. Moreover, upon tasting anything disagreeable, like mustard, pepper, or salt, they would nervously shake a forepaw in a manner wonderfully like a cat.

As the climate in summer is very fine, we slept out in the open air, without a tent, and not infrequently were awakened by feeling something clambering over us, or tugging at the blanket, and, as we started up, saw a badly frightened fox scampering away into the darkness.

Although we continually saw them during the day, the foxes are in general nocturnal, or, at least, of crepuscular habits. During the evenings the canyon resounded with their barkings. This bark or cry is a very peculiar and quite indescribable sound; a fair imitation of it may be produced by turning the handle of a well-filled coffee mill half-way round, sharply and suddenly. The foxes inhabit caves and crevices in the rock, or sheltered retreats

in the thick bushes, during such time as they are not abroad, and one of my companions once came upon one fast asleep, under a low bush, during the heat of the day.

Their food seems to be of the most varied and miscellaneous character. The berries of certain plants are undoubtedly their main reliance, and to obtain these the foxes actually do a good deal of climbing, for we more than once discovered them awkwardly perched in the top of a good sized bush, eight or ten feet from the ground. Besides berries, they eat crabs, for which they search diligently along the rocks at low tide. While walking among the hills one morning I discovered the half-decayed body of an old ram, which had evidently died a couple of days before. Upon coming nearer I observed the tail of a fox protruding from a huge hole in the side of the carcass, and as I approached the fox came out and ran up to me, apparently impelled by curiosity. He presented a spectacle more easily imagined than described, suffice it to say that his appearance afforded ample evidence of the nature of his repast

During the spring the foxes undoubtedly devour the eggs of the smaller birds, when they are fortunate enough to secure them; the gulls, cormorants, and oyster-catchers all nest on the isolated rocks.

More than once we came upon foxes blind in one eye; sometimes both eyes were half closed up. We attributed this misfortune to the long spines of the cactus (Opuntia engelmanni) which abounds upon the island. [It would seem more reasonable to suppose their blindness to have been caused by the acts of birds in defending their nest, than from the spines of Opuntia, which our native animals are usually able to and do avoid.—Ed.]

The jays (Aphebo coma insularis, Henshaw,) do not seem to be much afraid of the foxes, and we often saw amusing quarrels between the two. On one occasion a fox was eating a good sized piece of fish bone on the bank previously referred to, and a jay was perched upon a low branch about a foot above his head. Every time the fox's attention was distracted for a moment from his meal, the jay would dash down from his perch and try to carry off the bone, but always without success, though he occasionally captured a morsel of fish.

Although the foxes were, as I have stated, wonderfully tame, we did not succeed in inducing them to take food actually from our hands, though they would often approach within a yard of us when we held out some tempting morsel to them. I have no doubt, however, that they would have soon conquered this natural timidity if we had remained longer at the island, as we took care not to frighten them in any way, valuing too highly our remarkable advantages for observing the habits of these curious animals in their natural state.—*E. W. Blake, Jr., in Random Notes on Natural History.*

A DISAPPOINTED HORSE.

The following anecdote was related to me by some settlers in the mountains back of San Diego, bordering the Colorado desert, which well illustrates the reasoning power of animals :

A ranchman owned a black mare who had always lived in the mountains, and has seen the snows of many winters on those hills and in the valleys, and in some way had learned that snow was essentially water in a solid state, requiring heat only to convert the pure white mineral into a refreshing liquid.

One day the ranchman started down into the desert on a prospecting tour, as he had a slight attack of the gold fever, and he took his horse along with him, traveling some ways without water. When at last he came to a stopping place, the horse was very thirsty, and, seeing a large bank of very white sand near by, at once started to slake his thirst by eating what he supposed was snow from the drift. Only those who have had similar experiences can imagine the feelings of the poor tired horse—hot and thirsty in the arid desert, best expressed in the single word—discouraged. *C. R. Orcutt.*

THE PALM AND ITS VARIETIES.

Linné, the great botanist, has not inaptly called the tall and crested palm trees "the princes of the vegetable world," and wherever they bloom they enrich the landscape by their grace and majesty. The most perfect of the order have a tall cylindrical stem, which shoots upwards from the earth, without knot or blemish, like an Ionic column; springing to an immense height, and yet so symmetrical that its slenderness conveys no idea of feebleness. The summit bears a crown of emerald green plumes, like a diadem of gigantic ostrich feathers; these are frequently twenty feet long, droop slightly at the ends, and rustle musically in the breeze. In the arid desert it forms an object of peculiar beauty, as it soars, erect and graceful, near some welcome spring of living water, a landmark to the wayworn traveler; but to see it in all its glory you must visit the palm-groves of Tropical America, or Polynesia, and wander enchanted in their grateful shades. Under the natural screen which the thick green feathery branches supply, the orange and the lemon, the pomegranate, the olive, the almond, and the vine, flourish in wild luxuriance, and pour forth an abundance of luscious fruit. And here, while the eye is never weary of gazing on the glorious blossoms which brighten and adorn the scene, the ear is also ravished with the sweet, clear melody of numerous birds, attracted to the palm-grove by its cool shadows, its fruits, and crystal springs.

The valley of the Amazon rejoices in an infinite variety of these beautiful trees. Among them a foremost place must be given to the fan-leaved palm which abound in the islets and on the banks of the mighty river and its tributaries. These stems are huge smooth cylinders, three feet in diameter, and about a hundred feet high. Their crowns consist of enormous clusters of fan-shaped leaves, whose stalks alone measure seven to ten feet in length.

Nothing in the vegetable world, we are told, can be more imposing than this grove of palms. No underwood obstructs the view of the long perspective of towering columns, which forces on the spectator's mind the remembrance of long-drawn aisles of Gothic cathedrals. The crowns, densely packed together at an immense height overhead, shut out the rays of the sun; and the gloomy solitude beneath, where every sound has a strange reverberation, can be compared to nothing so well as a solemn temple. In such a scene it is meet that the soul, "on Devotion's wing," should mount to God!

Humboldt christened the Mauritia flexuosa or fan-leaved palm, the "Tree of Life." It is the chief, almost the only nourishment, he says, of the unconquered nation of the Guaranis, at the mouth of the Orinoco, who skillfully stretch their mats—woven from the nerves of the leaves—from one trunk to another, and during the rainy season, when the Delta is inundated, live like apes in the tops of the trees.

These habitations are partially roofed with mud; the women light their household fires on a flooring of the same material; and the traveler, ascending the river at night, gazes astonished on the hundred spiral shafts of flame and smoke which seem kindled in the very air!

But not only with a habitation does the Mauritia supply these savages; it also feeds them. Before the flowers are developed, the trunk affords them a farinaceous pith, like sago; the sap provides wine and the "joys of Bacchus;" the fresh fruits, covered with scales like fir-cones, yield them nourishment, whether they eat them after the full development of their saccharine principle, or when they simply contain an abundant pulp

The fruit was first taken to England by Sir Walter Raleigh. The tree does not attain maturity in less than 120 or 150 years.

The assai palm (Euterpe oloracea) deserves mention on account of its edible properties. The fruit, which is perfectly round, and about as large as a cherry, contains but a small quantity of pulp, lying between the hard kernel and the skin. With the addition of water, the pulp forms a thick, violet-colored beverage, which stains the lips like blackberries, and is universally drank by the Indians of the Tocantins. The tree itself rises, without knot or blemish, to a great height. The outer part of the stem is as hard and as tough as horn, split into narrow planks it is used for the walls and flooring of the Indian huts.

A noble palm grows in the neighborhood of Santarem, which the natives call Bacàba (Œnocarpus distichus). It grows to a height of forty or fifty feet. The crown is of a shining glossy emerald-green, and of a singularly flattened or compressed shape; the leaves being arranged on each side in nearly the same plan. The fruit ripens towards the end of winter, and the natives manufacture from it an agreeable liquor, by rubbing off the pulpy coat of the nuts and mixing it with water. The beverage resembles milk, and possesses a piquant nutty flavor. As the Bacàba, on account of its smooth stem, is very difficult to climb, the natives, whenever they want to quench their thirst with its fruit, cut down, and thus destroy—with the wasteful thoughtlessness of all savages —a tree which has taken a score or two of years to grow.

The Urucuri (Attalea excelsa) is another Brazilian or Amazonian palm, and one of singular beauty. It flourishes in immense groves under the crowns of the loftier forest trees; the smooth pillar-like stems being nearly all of equal elevation, forty or fifty feet; and the broad, finely-pinnated leaves interwoven above in a natural dome-like vault of ever fresh greenery. The fruit, which in size and shape resembles the date, is never eaten by the Indians. It is palatable but not wholesome.

But still more celebrated in Tropical America is the wide-spread Peach palm (Gulielma speciosa), called by the Tupé Indians the Pupunha. The English name would seem to allude to the color of its fruit rather than to its flavor, which travelers contemn as "dry and mealy," or like a "mixture of chestnuts and cheese." Vultures devour it eagerly, and hover about the tree, when it is ripe, in noisy and quarrelsome flocks. The Pupunha is a noble ornament to the landscape, being, when mature, from fifty to sixty feet in height, and frequently as straight as a scaffold-pole. A bunch of ripe fruit is a sufficient load for a strong man, and each tree bears several of them. The nut, in good condition, is as large as a full-sized peach, and, if boiled, will bear comparison with an Irishman's delicacy—a mealy potato. In the neighborhood of Egra, where the Pupunha is carefully cultivated, it is thus prepared for table, and eaten with treacle or salt. A dozen of the seedless fruits make, it is said, a good meal for a grown-up person.

It is astonishing to what a variety of uses the Amazonian Indians apply the palm. It provides them with house, food, drink, raiment, salt, implements, weapons, fishing tackle, and even musical instruments. The rafters of their huts are formed, perhaps, of the straight and uniform palm called Leopoldina pulchra; the Carana is brought into requisition for the roof; and the split stems of the Iriartea exporiza furnish the doors and framework. The wide bark which grows beneath the fruit of another species is woven into an apron. The comb with which many of the natives adorn their heads is made from palm wood, and their

fish-hooks from its spines. Caps for the head, and cloth for the loins, are manufactured from the spathes of the Manicaria saccifera. These, too, supply the natives with his hammock and bow-strings. Various species of palms yield oil and edible fruit; from eight kinds an intoxicating liquor can be distilled; and from the Jara assu, by burning its small nuts, he procures a substitute for salt. From the spinous processes of the Patawa he makes his arrows, and arms himself with lances and harpoons from the Triatea ventricosa. The long blowpipe through which he hurls the envenomed dart at birds and animals comes from the Setigera palm; from the stems of various trees he fashions the harsh, bassoon-like, musical instrument employed in his "devil-worship;" and, finally, the great woody spathes of the Maximiliana regia provide him with cooking-vessels.

In Ceylon and Malabar one of the principal palms is the remarkable Talipot, Talipat, or Umbrella-bearing palm (Corypha umbraculifera), which frequently attains the extraordinary elevation of 100 feet; is straight as a giant's spear; five feet in circumference at the base, and tapering towards the summit, where it terminates in a magnificent crown of enormous palmate plaited leaves. Each leaf, near the outer margin, is divided into numerous segments, and united to the trunk by spiny leaf-stalks. It usually measures about eighteen feet in length, exclusive of the leaf-stalk, and about fourteen feet in breadth; so that a single leaf will form an excellent canopy for a score of men. It is consequently employed for many important purposes, such as roofing houses or making tents. The Singalese noble, on state occasions, is always followed by an attendant bearing above his head a richly ornamented talipat leaf, which can be folded up, like a fan, into a roll of the thickness of a man's arm, and is wonderfully light. In Malabar, the leaves are used as a substitute for paper, the characters being inscribed with an iron stylus, but they undergo a preliminary process of boiling, drying, damping, rubbing and pressing. The oil employed in coloring the writing preserves them from insects, but changes with age, so that a Singalese determines the date of a book by carefully smelling at it.

Above its crown of leaves the talipat, at the age of thirty or forty years, raises an erect pyramid of flowers, of a bright creamy hue, but disagreeable odor. At first they are enclosed in a hard sheath, from which, when matured, they extrude themselves with a loud noise. To this peculiarity Moore alludes in the following lines:

> "Hearts where, slow but deep, the seeds
> Of vengeance ripen into deeds,
> Till, in some treacherous hour of calm,
> They burst, like Zeilan's giant-palm,
> Whose buds fly open with a sound
> That shakes the pigmy forest round!"

The fruit is abundant, globose, and about an inch and a half in diameter. As soon as it has ripened the tree decays, and in two or three weeks lies rotten on the ground.

Vegetable ivory, now manufactured in o many ornamental articles, is the hardened albumen of the Corosso (Phytolephas macrocarpa). It is clear and liquid at first, then milky and sweet, and finally solid. The stem of the tree which produces the corosso nuts is so dwarfed that they lie in clusters upon the ground, while its enormous tufts of pinnated leaves attain the height of twenty feet. The corosso is a native of the sheltered and romantic valleys which nestle among the Peruvian Andes.

Wax is obtained from several species of the Palmaceæ, as from the Ceroxylon, or Wax palm, discovered by Humboldt in South America, which grows to a height of 180 feet, and the Camanba (Corypha cerifera), whose fan-like leaves are coated with a yellow wax.

From the Calamus verus we obtain the well-known canes called ratans; and the Sago palm (Sagus farinifera), which flourishes in the swampy districts of the East, supplies us with a farinaceous food of great value. The Corypha Australia, a native of Victoria, Australia, yields a profusion of fan-shaped leaves, which are employed in the manufacture of straw hats. This noble tree attains the stature of 140 feet.

The palm oil largely used in the manufacture of soap and candles, and in the preparation of the peculiar compound with which the wheels of railway carriages are greased, is expressed from the nuts of the Elais palm, a native of Guinea. The Areca, or Catechu palm, yields the celebrated betel nuts, so largely masticated by the Hindoos. From these nuts our chemists obtain an astringent decoction, useful in dyspepsia, and many other diseases.

What would become of the wanderer in the deserts of Arabia and Barbary, if Providence suddenly decreed the extinction of the Date palm (Phœnix dactylifera)? Thousands of human beings would inevitably perish, for the inhabitants of Fezzan live wholly upon its saccharine and delicious fruit for nine months in the year. In Egypt, Arabia, and Persia, it forms the principal food of the people, and a man's wealth is computed by the number of date palms he possesses. When dried, the fruit becomes an important commercial staple Cakes of dates pounded and kneaded, until solid enough to be cut with a hatchet, supply the provision of the African caravans on their toilsome journey through the sun-lighted Sahara. The young leaves, or palm cabbage, are eaten by the Persians and Arabs, who also distil a species of wine from the sap, by fermentation. A single palm will yield three or four quarts daily for a fortnight, after which the quantity diminishes, and the tree gradually dries up. The date stones or seeds are roasted as a substitute for coffee, or ground for the sake of their oil, and the residuum given as food to cattle.

Bags and mats are made out of the leaves; the fibres supply a rude, rough cordage; and the leaf-stalks all kinds of basket and wicker work.

The Date palm is the palm tree alluded to in Scripture, and in the oasis of the Great Desert springs up, a fountain of life, for the refreshment of the traveler and the sustenance of the Arab nomade. It generally attains a height of fifty feet, is crowned with a crest of from forty to eighty glaucous pinnated leaves, and flowers at the age of twelve years.

In Egypt we meet with the Doum palm, a tree of shorter stature, but remarkable for the repeated forkings of its stems. From the sweet and yet pungent flavor of its fruit, it has been popularly called the gingerbread tree; but to an European stomach the gingerbread would prove sadly difficult of digestion. The kernel resembles ivory, and the natives fashion it into beads and other small articles.

Both the Date and the Doum palms are found in Egypt, but the former disappears as the traveler descends the Nile, and enters Nubia. Generally speaking, it may be said that the Doum is the Egyptian, as the Date is the Saharan palm tree. Its value is not so great as that of its famous congener, nor are its uses so various; but then the Egyptian is less dependent upon it than the Arab upon the date. To the inhabitants of the Sahara the latter is food, comfort, wealth, nay, life. It is easy to understand, says a French writer, the gratitude cherished by the Arab towards this tree, which thrives in the sandy waste, draws sustenance from brackish water fatal to almost any other plant, preserves its freshness when all around it decays and withers under the rays of an implacable sun, and resists the tempests which bow its flexible crest but cannot tear up its solidly-planted roots It may be said, without exaggeration, that a single tree has peopled the Desert; that, without it, the nomade tribes of Western Africa must cease to exist

What the Date palm is to the Arab, the Cocoanut palm (Cocos nucifera) is to the Polynesian. Originally it would seem to have been a native only of the Indian coasts and South Sea Islands, but it is now diffused over all the tropical world. There are about eighteen known species, of which only one, the Cocoa-nut itself does not belong to America, but flourishes best in the neighborhood of the sea-coast. It is the crown and glory of the coral islets which stud the sapphire expanse of the Pacific Ocean; its cylindrical and slender stem, about two feet in diameter and from 60 to 100 feet in height, with its crest of green, drooping, pinnated leaves, generally sixteen to twenty in number, and from twelve to twenty feet in length, forming a conspicuous ornament of the tropical landscape—of

> "The studded archipelago,
> O'er whose blue bosom rise the starry isles;"

and justly entitling it to the poet's praise, as

"The loftiest Dryad of the woods,
Within whose bosom infant Bacchus broods."

The uses of this tree are manifold, and its valuable properties claim man's gratitude. Its hard, agate-like, polished timber, known as palmyra and porcupine wood, is prized by the cabinet-maker; the hard nut which encloses its fruit the savage carves into handsome bowls and goblets; the milky liquid within has a sweet and delicious flavor, and is very wholesome, refreshing, and digestible; the fibrous husk can be woven into sails and cordage, or used for stuffing mats and cushions; the terminal bud, or palm cabbage, is delicate eating; the central part of the stem, when young, affords a sweet and excellent food; the fermented sap yields the spirituous liquor so well known as arrack; the dried leaves can be employed for thatch; and every boy knows that the nut itself is a popular and justly-prized dainty.

Commercially speaking, the most valuable product of this all-important tree is the oil or butter obtained from its kernel, and largely used in Europe in the manufacture of stearine candles. In the East it is employed as an unguent, and for illuminating purposes. It is obtained by pressure of the kernel, or by boiling it over a slow fire. Seven or eight nuts will supply one quart. It is liquid in tropical climates, but in colder temperatures solidifies into a white, butter-like oil. Compression separates it into a more liquid part called olein, and a more solid part known as cocosin or cocostearin.

The Cocoa palm ripens in about seven years, and continues productive for seventy or eighty, each tree bearing annually from eighty to one hundred nuts.

The Double cocoa-nut (Cocos de Mer) of the Seychelles Islands, which, in the early days of maritime enterprise, was regarded as a marvel, and originated a score of fables, is the fruit of a palm of a wholly different genus (Loidoicea Seychellarum). It was originally found floating on the waves of the Indian Ocean, and as its birth-place could not at first be discovered, became enveloped in an atmosphere of mystery. As a supposed talisman against poison and infectious diseases, it was eagerly sought after; and a good nut would bring the enormous sum of £150. It was said that only one tree in the world produced this rare and wondrous fruit—"Solomon's Nut" was the popular appellation—and that its roots were fixed deep in the ocean bed, while a griffin kept watch and ward over the treasure, as the Dragon over the Hesperidan apples. But in 1768 it was discovered by two French officers, Captain Duchen n and M. Barré, growing plentifully in the Seychelles Islands; and was ascertained to be the fruit of a palm, with a straight, slender stem, 100 feet high, which requires upwards of a century and a quarter to reach maturity. The

whole tree possesses the useful properties of the family to which it belongs, and flourishes on only two islands in the Seychelles group, which are named Praslin and Curieuse.

What rice is to the Hindoo, what wheat is to the European, is the Banana (Order Musaceæ) to the inhabitants of the tropical islands. They would perish without it; or be reduced to feed, like the beasts, on the herbage of the fields. But the banana supplies them with a wholesome and abundant food, with a pleasant drink, with a valuable medicine, with materials for clothing, in a word, with almost all the necessaries of their simple and easily contented life. It is now understood to be a variety of the plantain.—*Science Series*.

ASTRONOMICAL NOTES.

Progress in astronomy no longer depends upon chance observation, but is now effected by a division of labor and a concentration at certain points upon some particular object of research. The leading observatories all work at specialties. At Harvard, the relative magnitude of the stars receives chief attention; at Princeton, spectroscopy; at Alleghany Observatory, the dark part of the solar spectrum and the effect of the invisible heat rays on the earth; at the National Observatory, positions and orbits of satellites; at Cincinnatti, double stars; at Chicago, the surface of Jupiter; at Albany and Yale, the perfecting of maps of the heavens.

A striking illustration of the value of the camera to astronomy is furnished by the recent discovery of a new nebulæ near the star Maia in the Pleiades. Until photographed at the Paris Observatory, this nebula had never been seen by the best glasses although it has since been detected with the great telescope of the Pulkova Observatory. The Emperor of Brazil now announces his determination to co-operate, at the Rio de Janeiro Observatory, in the general project of photographing the entire heavens, already begun at Paris with such unexpected success.

A recent photograph of the Pleiades shows 1421 stars, while a carefully drawn chart, with about the same instrumental power, gives only 625. Many small objects seen in the photograph do not appear in direct eye observations. The importance of the accurate photographic method of star-mapping, is indicated by the fact that the hand-drawn chart gives ten stars which have no existence.

The principle of telescopes was described by Roger Bacon, about 1250, and Leonard Digges—who died about 1573—is said to have arranged glasses so that he could see very distant objects.

Galileo constructed telescopes in 1609, and discovered Jupiter's satellites in 1610.

A study of the asteroids by Prof. Arthur Searle, has shown peculiarities in the belt of sky they traverse which correspond with those of the zodiacal light, and suggests the hypothesis that the light may be partly due to minute objects circulating in orbits like those of the smaller planets.

On June 22, 1885, there appeared on the sun's disc, one of the largest spots ever detected there, which would hardly have been perceived, however, if its occurrence had not been recorded by photographic apparatus.

A German astronomer has found reasons for believing that the zodiacal light and the aurora borealis result from the reflection of sunlight by water and ice.

At the beginning of the year 163 asteroids were known, nine having been discovered during 1885. Up to the close of 1884, the number of comets observed for which orbits have been computed, was 302, of which twelve have proven themselves to be periodic, and have been re-observed more or less frequently.

Besides Venus, Mercury and the suspected intra-Mercurial Vulcan, Mons. J. C. Houzeau, of the Brussels Observatory, thinks there may be another planet between the earth and the sun. A telescopic object has seven times been observed near Venus, the last time in 1764, and an examination of the data thus furnished, makes it appear probable that this body is an unknown planet with an orbit about equal to that of Venus or a little larger, the latter case making it our nearest planetary neighbor. It must come in conjunction with Venus at intervals, which are multiples of a little less than three years. The hypothetical planet is called Neith, and ambitious amateur astronomers are advised to search for it.

NECROLOGY.

Mrs. Thomas Say, the widow of the well-known naturalist, who has been dead over fifty years, died at Lexington, Mass., on November 15th last.

Dr. W. F. Tolmie, known to ethnologists for his contributions to the history and linguistics of the native races of the West Coast, died on the 8th of December, at Victoria, B. C. He was born in Scotland, but has been a resident of this coast since 1833.

The death of Paul Bert has recently been announced.

Dr. Isaac Lea died at his home in Philadelphia on the 8th of December. A sketch of the life of this eminent scientist was given in the January issue of the WEST AMERICAN SCIENTIST.

CORRESPONDENCE.

HAMILTON, Ind., Dec. 27, 1886.

DEAR SIR:—Please find enclosed stamps for specimen copy of your magazine, and also stamp for information I desire. I wish to procure some "singing sand." I have read that it was found in Lower California. Can you give me the address of some one that I could be enabled to get a specimen of it? Do you know whether the sound is very perceptible? Yours respectfully,

T. A. Beecher.

[The December issue of the WEST AMERICAN SCIENTIST gives an account of the sonorous sand found in one of the Sandwich Islands. Previous issues contained mention of the singing sands of San Diego and other portions of the country. These sands at San Diego are found on the ocean beach, and do not differ from other beach sand materially. It obtains its musical properties seemingly by drying and forming a soft crust, which when broken or disturbed by the foot produces a gentle woo, woo, woo, that may be heard in a calm for twenty yards or more.

ED.]

WINFIELD, Kansas, Jan. 8, 1887.

C. R. Orcutt, Esq., San Diego, Cal.:

DEAR SIR—Inclosed find ten cents, for which send me sample copy of the WEST AMERICAN SCIENTIST, as advertised in *Gunn's Climate*, etc., of San Diego, Jan. 1, 1886, a copy of which I have. I send also two cents in stamps additional, for which send me any later brochures issued for gratuitous distribution about the San Diego country. Is there a larger and better map—showing mountains and physical features of San Diego County, or Southern California—than that attached to Gunn's pamphlet? If so, let me know the price, and I will send the amount for a copy; or if you choose to send with price marked on it, and the cost does not exceed, say, one dollar, I will remit upon receipt. I want a better map than the one attached to Gunn's pamphlet, if such has been issued. Yours truly,

J. F. McMullen.

[Any one knowing of a better map than the one referred to will oblige by calling attention to it. The new edition of Capt. Gunn's work, it is hoped, may be an improvement on the last in this respect. We hope to give such a map as is wanted in a future issue of this magazine as soon as time may allow of the completion of present arrangements. ED.]

The sun has crossed the line. It is surmised that he was cashier of the bank where the wild thyme blows.

PROCEEDINGS OF SOCIETIES.

California Academy of Sciences.—January 3, 1887. The annual election of officers resulted as follows: H. W. Harkness, President; H. H. Behr, G. Hewston, Vice-Presidents; A. Ferrer, Corresponding Secretary; C. G. Yale, Recording Secretary; John Dolbeer, Treasurer; Carlos Troyer, Librarian; J. G. Cooper, Director of Museum; C. F. Crocker, T. P. Madden, J. M. McDonald, E. L. G. Steele; S. W. Holladay, D. E. Hayes, and E. J. Molera, Trustees.

The Treasurer reported the receipts of the Academy during the past year as being $12,357.58; disbursements, $9,912.60. S. B. Christy reported 417 letters sent and 530 received during the year, as Corresponding Secretary.

The Librarian reported the accession of 2,401 publications.

Prof. Davidson, the retiring President, stated in his report that during the 19 years he has been connected with the Academy he can recall no year when better work was done.

Santa Barbara Society of Natural History.—December 28, 1886. At the adjourned annual meeting, the following officers were elected: H. C. Ford, President; R. F. Bingham, Dr. L. G Yates, Mrs. A. A. Boyce, Vice-Presidents; Mrs. R. F. Bingham, Recording and Corresponding Secretary; Mrs. M. A. Ashley, Treasurer; Mrs. F. C. Lord, Curator and Librarian.

The official reports stated that twelve meetings, with an average attendance of ten, had been held during the year; fifteen papers specially prepared by members, and many more informal articles had been read; the present membership, 21, the same as when organized in 1876; bound volumes in library, 1,431, of which 185 were received during the year; number of pamphlets, 130.

Dr. Yates presented a memorial of Dr. Isaac Lea, an honorary member, who died December 9th, at the age of 92. Dr. Lea was the first honorary member of the Society, elected during the winter of 1876, when at Santa Barbara.

San Francisco Microscopical Society.—December 8, 1886. Dr. Ferrer exhibited and briefly described the new Zeiss Photomicrographic camera and stand.

December 22, 1886. Prof. Runyon exhibited a number of photo-micrographs. William Norris called attention to several interesting series of slides of diatoms, from various sources, which he donated to the Society.

EDITORIAL.

The editor was recently requested to visit the principal mines of this, and the neighboring county of San Bernardino, for the purpose of forming a collection of the minerals and average specimens of the ores, for the American Exhibition, to be opened in London, England, on the 2d of next May. The results will

probably be given our readers in a future issue. Any assistance will be gladly received that may increase our knowledge of the natural mineral resources of this region, or of our fauna and flora.

NOTES AND NEWS.

A worm has been discovered that seems to delight in boring holes in lead plates and pipes.

A Wisconsin young man was seriously poisoned by a red silk handkerchief used to wrap up a wounded hand.

Unclaimed dogs in London are killed painlessly by being sent to sleep in an atmosphere of chloroform, bisulphide of carbon, and carbonic oxide.

A French geographer reports that all the peaks of the Alps, extending over a distance of more than 150 miles, are easily visible from the summit of the Dole, which has an altitude of about 5,500 feet.

To exterminate the rabbits, which have become a plague in Australia, it is proposed to propogate a contagious disease among them, and the experiment is to be first tried on Torrens Island.

Lake Rivers.—Surveys made during the past two years have shown that the River Rhone has cut for itself a channel in the bottom of Lake Geneva, through which it flows, between parallel banks, like an ordinary stream on the earth's surface. The Rhine makes a similar passage through Lake Constance.

The remains of a distinct type of dog, widely differing from any of the ordinary wild or domestic dogs, have been described by Mr. J. A. Allen. The bones were found in Ely cave, Lee Co., Virginia. In general form the animal was short-limbed and heavy bodied, resembling in its proportions a badger rather than a dog. It is proposed to consider the remains as belonging to a new genus, and has been named Pachycyon robustus.

On the Transcaspian railroad in Russia, now approaching Merv, it is claimed that about $800 per mile is being saved by the use of ozokerite, or mineral wax for ties. When purified, melted and mixed with limestone and gravel, the ozokerite, which is abundant in the vicinity of the railroad, produces a very good asphalt. This is pressed into shape in boxes, and gives ties which retain their form and hardness even in the hottest weather.

Limit of Hearing.—It has been found by Dr. Tait that the ear in woman can perceive higher notes—that is, it sounds with a greater number of vibrations per second—than the ear in men. The highest limit of human hearing is somewhere between 41,000 and 42,000 vibrations per second. Few persons have equal sensibility to acute sounds in both ears, the right ear usually hearing a

higher note than the left. The lowest continuous sounds have about sixteen vibrations per second.

Tillable Lakes.—Prof. Schwalbe has drawn the attention of the Berlin Physical Society to two interesting phenomena observed in the gypsum of the Southern Hartz, viz., the sinking of rivers, often accompanied by loud uproar, and the occurrence of intermittent lakes. The so-called "peasants' ditch," near Rosslau, was, in the last century, as the old contracts between the two neighboring villages prove, sometimes a lake serving one village for fishing purposes, and sometimes dry land, which was then tilled by the other village. Several channels at the bottom of the lake lead to the interior of the gypsum rock, yet the water, when it gathered here, stood for several years at a depth of thirty to fifty feet, when it suddenly disappeared again. In the years of 1876, 1877 and 1878, this lake was filled with water, and since the last date has been dry land.

Geographical Progress.—The advancement of geographical knowledge is now encouraged by 94 geographical societies, with nearly 50,000 members, and a total income of more than a quarter of a million dollars annually. Of these societies France has 26, with a membership of 18,000; Germany 24, with 9,000 members; Italy and Switzerland, 6 each, with 3,000 members; Great Britain and her colonies, 5, with 5,000 members; the United States, 2, with 1,500 members. There are 126 periodicals devoted to geography, of which 42 are published in French; 38 in German; 8 in Russian; 7 in Italian, 6 each in English, Spanish and Portuguese; and 1 each in Danish, Hungarian, Swedish, Roumanian and Japanese.

In a report to the French Academy of Sciences, on the 172 tornadoes recorded in the United States in 1884, Mons. Faye considers it established that there is a definite portion of an area of low barometer most favorable to tornadoes. The Signal Service reporters are now endeavoring to determine this "dangerous octant" still more accurately. A memorable day in the history of tornadoes was February 19, 1884, when no less than forty-five were recorded in the South-Eastern States, attended with a loss of 800 lives, 25,000 injured, 10,000 houses and buildings destroyed, and 15,000 people left homeless.

Japanese Seismology.—Regular earthquake observations are now made in Japan according to Prof. Seikei Sediya, of the University of Tokio, at over 600 stations throughout the empire. From the reports sent in by different observers, maps have been made showing the disturbed area in every shock, and a summary of observations during the last year has been compiled. The total number of earthquakes in Japan in 1885 was 482, or 1.03 per day. In Tokio alone 68 shocks were registered. They are most prevalent in the northern and central portions of the main island

and on the Pacific Coast, while they are few in the provinces bordering the Japan Sea. Of the whole number, 235 local disturbances were recorded, which extended over not more than 100 miles of land area. The maximum area of one earthquake was 34,700 square miles. The aggregate area of disturbance during the year was 796,000 square miles, which is equivalent to saying that the whole of Japan has been shaken 5.4 times during the year.

LITERATURE.

Another valued contemporary, *Random Notes on Natural History*, of Providence, R. I., comes to the conclusion of its third volume, and of the idea that it is needed, as well, announcing that it will be discontinued as a regular publication.

The *Century* magazine is rapidly nearing the immense circulation of 300,000 copies, and it is by far the best read magazine of all the great American monthlies, having greater sales, we are informed by the San Francisco News Co , than any other on this coast. 'The Life of Lincoln,' begun with its current volume, is the last achievement of its managers in adding to the popularity and historic value of its war series.

Scribner's Magazine has reached our table embellished with numerous fine engravings and a mass of literary excellence equal in every way to that of the higher priced monthlies.

The *Youth's Companion* celebrates this year its sixtieth anniversary. It might well be named the 'Universal Companion,' so widely is it read and so wisely adapted to all ages. Its contributors are the most noted writers of this country and of Europe. Among them are W. D. Howells, J. T. Trowbridge, Prof. Huxley, The Duke of Argyle, The Marquis of Lorne and Princess Louise, Archdeacon Farrar, C. A. Stephens. Admiral David Porter, Lieut. Schwataka, and many others. We do not wonder that the *Companion*, with such contributors, has nearly 400,000 subscribers. It costs but $1.75 a year, and a subscription sent now is credited to January, 1888.

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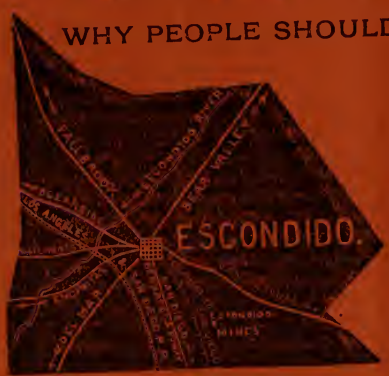

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THE WEST AMERICAN SCIENTIST.

VOL. III. MARCH, 1887. NO. 23.

MINERALS AND MINES OF SAN DIEGO.

The need of a geological survey of Southern California is very great, and it is to be hoped that Congress may provide for it in the near future. For twenty years or more gold has been profitably mined in the mountains of San Diego county and in the adjacent regions of the Lower California territory of Mexico. Every ledge of quartz has been found auriferous, I believe, and not only gold, but silver, copper, iron and other useful metals and minerals have been found in surprising quantities throughout the entire country. Positive proof exists as to the immense mineral wealth of San Diego, notwithstanding the fact that her resources in this line have been scarcely developed as yet, owing to the lack of capital and information as to the great possibilities.

With the remarkable increase in wealth and population of San Diego during the past year, where all other business interests have more than doubled in value, it is not surprising that the yield of the gold and silver mines of the county, amounting to a million of dollars in 1885,* should have increased to double that amount in 1886. In this paper I propose to give a few details regarding the present known minerals in this region and the leading mines that have been worked to any extent.

Julian is the oldest and best known mining district in the county, situated some sixty miles northeast of the city of San Diego. The mines have paid well as far as they have been worked, but from lack of capital many of them are still undeveloped. The following mines in this district deserve special mention:

The Stonewall mine, eight miles from the town of Julian, was discovered about sixteen years ago, and has been profitably worked ever since. The ledge is about 30 feet wide and 1500 feet in length, the ore assaying very rich in gold. Two 20-stamp mills are now in operation. This mine was recently purchased by Hon. R. W. Waterman.

*These estimates are given in the dailies, but I do not consider them very reliable.

The Ready Relief mine, Bailey Bros., proprietors, is five miles from Julian. The 12-foot ledge, some 1500 feet in length, is worked about 600 feet in depth, and was discovered in 1870. A 10-stamp mill yields about $26,000 a month, the ore, rich in gold and silver, assaying from $100 to $20,000 a ton.

The Owens mine, a half-mile from Julian, owned by James & Co., pays from $15,000 to $20,000 a month, and was found in 1870 also. The ledge, 300 feet in depth, is 15 feet wide by 100 feet in length.

The "Desert View," seven miles from Julian, on the edge of the American desert, is a lately discovered five-foot ledge, very rich in gold.

The "Valentine" is a four-foot ledge three miles from Julian, discovered in 1871, and owned by S. Wilcox. Yields both gold and silver.

The "Eldorado," also discovered in 1871, is a ten-foot ledge two miles from Julian, rich in gold and silver, and owned by the same party.

The Descanso mine has a three-foot ledge, 1000 feet in length. The ore assays $210 per ton.

The McDonald mine assays $30 to $40 per ton. Ledge six miles from Julian, and one to two feet thick.

The "California." "Golden Chariot," owned by an English syndicate," the "Shenandoah," "Gipsy," "Cargo Muchaco" and the "Hubbard" are among other valuable mines in this district. I am indebted to Messrs. Wilcox of Julian and McNamara of San Diego for many of these particulars, as well as for fine specimens from the several mines of the county, especially for characteristic ores of this district.

The Elsinore district has been brought into prominence during the last few years from the promising outlook of its coal mines and the abundance of its other useful minerals and valuable ores. The following gold mines have been worked or partially developed :

Good Hope mine, average mill run $100 to the ton.
Homestake and Yellow Jacket, runs $8 to the ton.
Virginia mine, runs $40 to the ton.
Buenos Ayres, average run $25 per ton.
Colorado, average $30.
Santa Fe, very rich in gold, assay not known.
Stele mine, average mill run $20, runs as high as $1200.
Chaney mine, assays $100 to the ton.
Menifee, average mill run $65 per ton.
Grampion and Elsinore mines, assay $1800 per ton.
Laura mine, an extension of the Elsinore.
Heald mine, assays $180 per ton, located in town site.
Hendricks mine, assays $30 per ton; ore contains also silver and copper.

In the Elsinore district we would mention the occurrence of large beds of potters' clay, fire clay, fire sand, "sewer pipe clay," mineral paint, yellow ochre, steatite (soap-stone), associated with talc and chlorite, asbestos and coal. Large quantitie s of pottery is now being made for the San Diego and Los Angeles market. The asbestos is utilized in the manufacture of fire-proof boiler covering; and the coal mines are being as rapidly developed as possible, the quality continuing to improve as well as the prospect of an abundant supply.

We are indebted for specimens from this district of the principal ores and mines to the generosity of Messrs. Banks, Warson, Hoff and others, and to Mr. Ira J. Gray, business manager of the WEST AMERICAN SCIENTIST, who volunteered to visit this and other localities in the interests of the proposed exhibit of the mines and minerals of the U. S., to be opened in May following in London, England. Crystalized quartz, gypsum, silver and copper ores, mineral gum, etc., are also among the products of the Elsinore district.

The Temescal tin mine, ten miles from Temecula, in San Diego county, though known for a long time, is yet undeveloped. I have not been able to learn the result of an assay of the ore.

At Penasquitas ledges of gold-bearing quartz have been opened, and also at San Jacinto, where extensive marble quarries await development as well.

Molybdenite occurs in the granite rocks at Campo, and is found associated with silver ore in the Jacumbe district, near the border of the Colorado desert. The ore at that locality assays about $28 to the ton in silver.

Quartz ledges in the Jamul district assay $6 to $8 in gold and silver, but are undeveloped.

Mica has not yet been found in any quantity of a paying quality. A beautiful golden mica comes in flakes as large as one's hand from Wilson's mine, near Warner's ranch. It occurs in small quantities throughout the mountains south into Lower California, where the jet black form is also found.

The San Rafael mining district, though comprising Mexican territory, deserves attention, as well as other mining regions of Lower California, because they are adjacent to and depend upon San Diego for supplies. At San Rafael are numerous very rich quartz veins, which have and are capable of producing large quantities of gold. Rich gold-bearing sulphurets are found in great quantities. Coal, silver, sulphur, iron, nickel, copper, etc., are among the immense ore deposits of this portion of the district which lies 95 miles southeast of San Diego.

Still more valuable deposits are found further south of silver, iron and copper; and famous placer mines have been worked in the mountains of the peninsula, annually producing much gold in nuggets or coarse "dust."

Antonite is the name given to a peculiar mineral found at San Antonio, about 80 miles south of San Diego. It has a beautiful silver lustre, and is utilized in the manufacture of imitation moire, antique silk, fancy papers, etc.

Agates are rarely found in the Lower California mountains or San Diego county. A poor variety of moss agate comes from Otay valley, a few miles from the city.

Chalcedony, calcareous tufa, cinnabar, a kind of cement rock in great abundance, feldspar, flints, garnets, pyrites of iron, magnetic iron ore, jasper, kaolin, lava, a form of malachite, so-called meerschaum, obsidian, opals (doubtful), the various forms of quartz, satin and green spar, soda-stone, salt (immense deposits in the desert), tourmaline, etc., are among the other minerals reported from the county or adjacent region.

I hope to treat this subject at some future time more exhaustively than possible at the present time, and with this end in view I shall be pleased to receive any information that is here omitted, or specimens of the minerals and rocks of Southern California or of the Mexican peninsula.

Brief mention of the borax mines, marble quarries, gold, silver and copper mines and other mineral deposits of the Calico mining district should not be omitted. I am especially indebted to Mr. C. C. Kent, through Mr. Gray, for specimens from this region.

In closing this hasty review my eye notices the beautiful "footprints of the fern"—crystals of manganese arranged in the most delicate imitation of sprays of mosses and ferns on the limestone of San Bernardino. *C. R. Orcutt.*

HAIRLESS MICE IN HUMBOLDT COUNTY.

A lady friend presented to our museum a specimen, of what appeared to be the ordinary house mouse, but totally devoid of hair —not even whiskers. Its color was a greyish-white, and its skin was curiously wrinkled like the rind of an orange, but in other respects, seemed to be in a normal condition. I considered it a freak, or possibly a diseased specimen, and thought nothing more of the matter.

Since then an entirely reliable gentlemen, has informed me that his barn has, for several weeks, been infested with these disgusting little vermin (they are singularly repulsive), and that he has trapped a dozen or more of them. He states that they were breeding in a barrel of oats, and the captured specimens were of various ages. Some of them had hair in "spots," the hairy places being densely covered as in an ordinary mouse, while the naked portions were absolutely bare.

The gentleman promised to save for me all other specimens that he might take. Now this phenomenon is new to me; but possibly not so to other of your readers who are better versed in "mouseology."

Will some of them inform me whether these animals have been noticed before, and, if so, what are the accepted conclusions regarding them? *Carl C. Marshall.*

ARCATA, CAL., January 31st, 1887.

HOW TO COLLECT PLANTS.

In forming an herbarium, much time and labor may be saved if one knows the methods that have been adopted by others, after, perhaps, much vexatious experience. Having been favored with personal instruction from such eminent botanists as the late Dr. Engelmann, Dr. C. C. Parry, C. G. Pringle, the "prince of collectors," D. Cleveland, Esq., and Dr. Asa Gray, I have been saved from some errors that the amateur is likely to fall into. For this reason, and in answer to requests, I will endeavor to give my methods and experiences in the field.

WHAT IS WANTED should be first understood. When possible, the whole plant, root and branch should be secured, with the leaves and flowers and fruit. This is easy in the case of annuals, where all may be combined in one example; but with perennials, specimens must be procured at different seasons, and care should be taken to collect each time from the same tree, or locality at least, when possible. In the case the whole plant may not be taken, as complete a series of the younger and older leaves, the flowers, the fruit, the wood, bark and root should be made as may be practicable, and such as are not suitable for the herbarium may be kept in cabinets.

Herbarium specimens should not be too large for a sheet of paper 11½x16½ inches, though, for convenience, many use sheets 12x18 inches, because of paper being cut to that size. If a plant is too tall, it may be bent or doubled up so as to occupy the required space only, as in the case of grasses, ferns and other plants.

Never be afraid of having too much of any kind. While a few specimens of common plants will answer, if one wishes to exchange with other collectors, he will require a great many examples, and in case a new or rare species is found, he will want a much greater number. Still, three examples if complete will answer, if not convenient to make more, but *less should never be taken if to be had.* One should never duplicate however if in so doing, he is apt to fail to secure something which he might otherwise collect.

The scientists requires that a specimen shall show *all the characters of a plant as fully as possible.* Select in the field the best and most complete individuals, and "so arrange them on the sheet, that they will be as pretty as a picture," but never sacrifice their completeness for the sake of beauty.

For the field, a portable press of boards or iron frames covered with wire cloth, secured with two or three straps, is the most convenient and serviceable. This should be 13x19 inches in size, or a little larger than the size of the paper used. Wrapping paper may be obtained and cut into sheets 18x24 inches, and folded, and when the specimen has been selected in the field, it should be placed between the sheets without delay. The plant may be withered, injured or lost, if one waits till he reaches a more convenient place. Driers may be placed between the sheets of plants for the immediate absorbtion of moisture, and should be changed as often as may be, twice a day at first, until the plants are completely dried. These driers should be 12x18 inches; carpet-felt or any absorbant paper—even newspapers, several thicknesses together will answer for this purpose, and should be dried when taken away from the plants that they may be ready again for use.

In making a specimen, note down *immediately* on the sheet enclosing the plant, the date of collecting, the exact locality, the character of the ground where found, and any other facts that may be observed in connection with the same. This is always very important, and one should never delay for fear of either forgetting or becoming confused after making a large collection.

To dry a plant quickly is very desirable, as the colors are then better preserved; with a hot sun one may dry out small plants, grasses, etc., in a single day in a wire press without driers between the sheets, and if time is precious and a plant has been in press a few days till it is perfectly wilted, it may be laid in the sun without any pressure, protecting the papers from the wind by stones placed at the corners. But one must use his judgment in this, as only certain plants can be treated in this manner with safety; many will curl up and be spoiled if not under pressure.

Certain plants, like cactuses, aquatic plants, fungi, mosses, and sea-weeds, require peculiar treatment.

Grasses are among the easier dried, and should always be preserved entire, as all of ours may be by folding the stems, showing inflorescence, stem, leaves and root It is best to collect at different seasons, so as to secure both flowers and seeds.

In returning with the spoils of the field, catalogue every species fully, give it a number to be restricted to the specimens of the same species from the same locality, under which each example sent to others shall be designated, and by which they shall always be known. *Never duplicate a number.*

I would close in the words of *The Botanical Gazette:*

"The resolution we would like to have each botanist make with the new year, is to do some good work and see to it that none goes unrecorded."

Many new workers are needed in nature's boundless unlimited field, and nowhere more than on the Pacific Coast

C. R. Orcutt.

THE LILY.

The lily of the field is fair,
  Upon its graceful stem,
No royal robes with it compare,
  Nor sparkling diadem.

The evening brings it precious dew,
  Refreshment without toil,
And morning crowns it all anew
  With hands that do not soil.

And from the sun, and from the breeze,
  The lily draweth power;
Its lovely mission is to please,
  And beauty is its dower.

E. E.

HISTORY OF THE AGASSIZ ASSOCIATION.

The Agassiz Association, as it appears to-day, is a union of 986 local societies, each numbering from 4 to 120 members, of all ages from 4 to 84. Our total membership is about 10,000. We are distributed in all the States and Territories, with very few exceptions, and have strong branch societies and active members in Canada, England, Ireland, Scotland, Chili, Japan, and Persia.

The 986 local societies are known as "Chapters." They take their names from the towns where they are established, and are further distinguished by the letters of the alphabet. Thus the first Chapter established here was called New York (A), the second New Zork (B), and so on.

I may mention four different sorts of Chapters. First, family Chapters. The parents and children of a single family unite for joint study and research. Chapters of this sort are especially desirable, and prove almost uniformly permanent. Chapters of another sort are found in schools. There are many teachers able and willing to give their strength and time, beyond the exacting requirements of their contracts, to the encouragement and assistance of their pupils. Under the fostering care of such men and women, the happiest results have been accomplished. Not the least important result is seen in the pleasant personal relations thus established between teacher and pupil. Chapters of a third kind are organized and conducted entirely by young persons. A company of boys or girls meet together, and decide to form a branch of the A. A. They elect their officers, draft their rules and by-laws, engage their rooms, build their cabinets, make their collections, prosecute their studies; and, if I needed to awaken interest and enthusiasm, I should have only to show what our girls and boys have done, even when unaided and alone. They have made lists of all the flowers that grow about them, and of all the birds that fly over their heads. They have published papers, started museums, founded libraries. In doing this, they have mastered the laws of parliamentary debate; have learned to observe with accuracy, to write with fluency, to speak with power; and, after working thus for a few years, many of them have pushed themselves into schools and colleges and laboratories of the highest grade, and are now completing their self-appointed preparation for lives of commending intelligence and cheerful service. Finally, I will mention Chapters of adults. In increasing numbers, men and women of mature years, feeling the need of that scientific training which the schools of their childhood failed to give, are organizing societies, joining their influence to our association, and receiving in return the benefits coming from united endeavor and from enthusiastic devotion to a common cause. But, excellent as the work of all these Chapters is, we have found some needed work beyond their individual attainment. A general con-

vention, for example, could hardly be received and cared for by a single Chapter; nor could a wide range of local observations be properly collated and discussed by the inhabitants of a single town. It has, therefore, been deemed wise to bring about the union of all the Chapters of a city or a State into more extended organizations than the single Chapter. These confederations of Chapters are called assemblies; the two most prominent at present being the Philadelphia Assembly and the State Assembly of Iowa.

Embracing all the little Chapters, binding into one the larger and more powerful assemblies, and making room also for individuals when Chapters cannot be formed, is an Agassiz Association. There are 986 Chapters, 46 Assemblies, but only one Association. And the influence and prosperity of each assembly can be increased and perpetuated by spreading everywhere we go a knowledge of our local work not only, and of our local organization, but also, and even with more emphasis, a knowledge of our entire association, with its broader membership and its further-reaching aims.—*Harlan H. Ballard, in the Swiss Cross.*

SANTA CRUZ ISLAND.

The *Pacific Science Monthly* contains the following editorial note in its eleventh number:

"E. L. Greene writes an interesting article for the December number of the WEST AMERICAN SCIENTIST on Santa Cruz Island, but he falls into some errors which we wish to correct. Prof. Greene believes himself the first to explore the island scientifically. The writer of this paragraph made a geological reconnoissance of the island in 1876, in connection with his archæological researches for the government. The island is not thirty miles long by ten wide, but twenty-one miles long, with an average width of four miles. Its shore line is fifty-three miles, all told. The highest elevation, instead of being a 'little under four thousand feet,' is but about two thousand feet."

THE WHISTLING TREE.

We learn from an exchange that, according to Dr. Schweinfurth the Acacia fistula, which grows in dense groves in Nubia, is known among the natives as the 'whistling tree.' It owes its name to the fact that a gall insect selects for the site of its operations the ivory-white shoots, which the development of the larva distorts and causes to swell at the base into a bladder-like gall, about one inch in diameter. The insect, upon emerging, leaves a circular hole, and the wind playing upon the shoot is said then to produce a flute like sound.

THE LABOR PERFORMED BY BEES.

'How doth the busy bee improve each shining hour,
And gather honey all the day from every opening flower.'

Some idea of the labor performed by bees in obtaining honey from flowers, may be obtained by reviewing the results of Dr. A. v. Planta's investigations. The flowers of the Alpine rose, acacia, and sanifoin are all favorites of the bees, and yet he finds that to obtain 1 gram of sugar, corresponding to 1 3-10 grams of honey, from the first species these insects must exhaust the nectar of 2,129 flowers; to obtain the same amount from the second species, 2,000 flowers must be visited; and to get an equal quantity from the last species, they must despoil not less than 5,000 flowers.

EXTINCT ANIMALS.

W. M. Lee, the well-known fruit grower of Tacoma, gives the particulars of a wonderful discovery of bones of extinct animals in Washington Territory which will attract the attention of the students of natural history and archæology all over the world. In a letter from Spokane Falls, he says: The face of the whole Territory shows unmistakable evidence of great volcanic upheavals. On my trip through Spokane County I stopped at Latah, and in conversation with Mr. Coplen, of that place, regarding the volcanic formation of that section, he informed me that he had examined some large bones of great antiquity. Accompanied by Mr. Coplen I went to the spring where the relics were dug out. It is located on a low strip of springy prairie. The excavation around the spring is twelve or fifteen feet deep, and thirty or forty feet across. The bones were covered by several distinct layers.

The first layer was ancient peat, then gravel, then volcanic ashes, then a layer of coarse peat. From this spring were taken no less than nine mammoths, or elephants, of different sizes, the remains of a cave bear, and hyenas, extinct birds and a sea turtle. Mr. Coplen kindly presented me with some specimens of these relics. The dimensions of some of the bones of the larger mammoths were wonderful to look at. The horns were a sort of tusk, and protruded from the head. By dropping the head in the act of feeding, the circle of the horns that extended below the jaws rested on the ground, giving support to the head, which is estimated to have weighed a ton.

The horns were worn away several inches deep at the bottom of the turn or half circle, indicating constant use by rubbing on the ground or rocks. One of these horns was ten feet and one inch

long and twenty-four inches in circumference. It weighed 145 pounds. One of the tusks measured twelve feet and nine inches in length and twenty-seven inches around. It weighed 295 pounds. The jaw weighed sixty-three pounds. The molar teeth weighed eighteen pounds each. Some of the ribs were eight feet long. The pelvic arch was six feet across, and an ordinary man could walk erect through this opening. The huge and antique monster was eighteen feet and six inches high, and was estimated to weigh twenty tons.

Just imagine far back in the misty by-gones of antiquity, probably before the appearance of man upon the earth, that Washington Territory was the home of these monstrous animals that roamed over the great prairies, traversed the Columbia river, and made the genial climes of Puget Sound their haunts in winter. It matters not what the theories may be in regard to these embedded bones of such huge proportions; why so many of them were piled together in these springy places; what period or age the animals lived; at what time the great change took place which made them disappear from the continent; whether they first made their appearance in this part of America and whether or not it was then a tropical climate.—*Tacoma Ledger.*

NATURE'S COMPASSES.

Look at this delicate plant, that lifts its head from the meadow ;
See how its leaves are turned North, as true as the magnet ;
This is the compass-flower, that the finger of God has planted
Here in the houseless wild to direct the traveler's journey
Over the sea-like, pathless, limitless waste of the desert.
—*Evangeline.*

The compass-plant of the prairies, Silphium laciniatum of botanists, is not unlike a small sunflower. The leaves always turn their edges to the north and south, choosing this position because the two faces of the leaf are about equally luminated by the sun.

The leaves of the prickly lettuce also have a tendency to point north and south.

A tree abounds in the forests of Nova Scotia, known in some sections as the hunter's compass, which almost invariably indicates the points of the compass.

A promient real estate man in San Diego, relates that some rats gnawed through a brass faucet in an earthern water jar, in a warehouse in New York, many years ago, for the sake of getting at the water. Could that have been their sole object?

PLEASURES OF A NATURALIST.

Well! I am safe in a civilized country at last. I have had a rather hard time of it. I had a narrow escape in the Mohave River and thought one while that I should have to stay there, but as I had a good horse I managed to pull through. Then I encountered a snow-storm on the desert and missed my way; went about twenty miles on the wrong road; it was snowing fearfully hard, the wind was blowing strong from the mountains, night was coming on and my horse was getting tired and hungry. The prospect of a night alone on the desert in a snow-storm, without food, water or shelter was not very inviting. When I had about given up hope of finding my way out, I came upon a camp of a couple of prospectors on their way home, and by their hospitality I passed quite a comfortable night. The next day being pleasant I found the right road, with their help, and reached the summit house at dark. There was six or eight inches of snow in the Cajon pass. *Ira J. Gray.*

San Bernardino, Cal., Feb. 21, 1887.

BOTANICAL NOTES FROM ABROAD.

The curious observation has been made that the cinchona trees growing in the hot-houses of Europe develope no quinine in their bark.

A gigantic sea-weed, more than 1500 feet long, has been discovered near the equator by the ship Clever, Captain John Stone, portions being taken to Montevideo. The plant has been botanically identified as Marcrocystis Pyrifera.

Primrose seeds from a height of 11,000 to 15,000 feet, in the Himalayas, have been received at Calcutta, and some are to be planted in England.

The importance of microbes to the growth of plants has been practically demonstrated by M. Laurent, who obtained only one-fourth as much buckwheat from sterilized mould as in soil containing bacteria.

By a Japanese process sea-weed is made into paper, so transparent that it may be substituted for window glass. When colored it makes an excellent imitation of stained glass.

The oil of an African bamboo is reported by Catholic missionaries to be an excellent lubricator, and, when refined, to form a fair substitute for olive oil. Its preparation bids fair to become an important industry in the Kongo region.

A series of festivals have been held in the north of France, in honor of Parmentier, who—only 100 years ago—was the first to bring the potato to French soil.

In an address at the London Royal Institution, Mr. Wm. Anderson has offered the suggestion that cork, on account of its porosity, may prove to be superior to India-rubber as a material for waterproof overcoats.

In nine years, oaken piles at Mieres, Spain, have taken on the appearance of stone-coal.

Dr. R. A. Philippi has published in Germany an important and interesting paper, detailing the changes wrought by man in the flora of Chili, where the native vegetation has been supplanted by that of Europe to an astonishing extent. The trees and plants of Europe, and only these (with the exception of the native potato), are found everywhere near habitations; and the original native flora has to be sought with care and system, and is found only miles away from cultivation and the abodes of men. In fact, the native vegetation is destroyed by that of Europe as effectually as the native inhabitant himself disappears before the white man.

OUR PARK.

San Diego has a park, consisting of about fourteen hundred acres, which has recently been discussed in the daily papers, some thinking it would be well to sell a portion by which to acquire means to cultivate and beautify the remainder.

Recently I heard the remark: "They need only to let Nature alone to have a beautiful park. In a few years, when the mesa is crowded with residences and all the lovely wild flowers have been frightened away, no spot will be so beautiful and so attractive as the one that has been neglected."

The remark at once recalled the remark of Colonel Barre to a British emissary, who asked, "And will these American children, planted by our care, nourished by our indulgence to a degree of strength and opulence, and protected by our arms, grudge to contribute their mite to relieve us from the heavy burden under which we lie?" Springing to his feet, Colonel Barre replied: "They planted by your care! No, your oppression placed them in America. They nourished by your indulgence! They grew by your neglect of them," and the concluding words of this thrilling speech, in which American patriots were first called "The Sons of Liberty," carried conviction to the hearts of his hearers, that only by England's neglect could the colonies continue to thrive.

In other matters, "a little judicious letting alone" is advisable. The wild flowers and shrubs of San Diego only ask neglect to flourish and beautify the grounds of the park, on a scale commensurate with the size of the country. Why go to the labor and expense of defacing the rugged beauty of these canyons, and mesas crowned and wreathed in the rainy season with a wealth of lovely wild flowers more beautiful than art can ever replace! Why try

to rob the country of all trace of what it has been when not a tree nor house nor ship marred the unrivalled beauty of San Diego; when the stately yucca, with its immense clusters of creamy white bells alone guarded our hills, the evergreen manzanita bloomed unseen, and the billowy sea of adenostoma made a grateful rest for the savage eye, like the grass upon a prairie or an Eastern meadow.

Let man do what he can; lay out beautiful walks and drives, erect fountains and conservatories for fair exotics, galleries of art and museums of history, but may he leave that which art cannot give—'what heaven hath done for this delightful land.'

SAN DIEGO, CAL., March 1, 1887. *A Reader.*

C. G. PRINGLE.

W. J. Beal writes the *Botanical Gazette:*

"On the 27th of November, for a few hours, I had the pleasure of the company of Mr. C. G. Pringle, of Charlotte, Vermont, who is on his way home from Northern Mexico, where he has again spent the summer collecting plants. All who have seen his specimens know that he is a prince among collectors. Next year he anticipates going on to higher grounds in the same country. He thinks it is a rough, dangerous way to live, some of the time among people who would not hesitate to kill him merely for his clothes. Still he is full of enthusiasm and likes the work. There is a perpetual fascination in finding new things, as well as in meeting with old friends among his plants."

NECROLOGY.

Nevos, an aged Indian, died in North San Diego on January 24, 1887, at the age of 125 years. Nevos was raised by the first missionaries that visited Lower California, and came with them to San Diego. He assisted in the building of several mission buildings, among them the old mission church at San Diego. He had been stone blind for many years, but worked until within a short time of his death in cutting wood, washing clothes, hoeing corn and beans, and was never known to injure a single hill. He always refused to go to the poor-house, and was well cared for at the last by a woman of the same race.

Gen. W. B. Hazen, the head of the U. S. Signal Service, died near the middle of January.

Prof. E. L. Youmans, editor and founder of the *Popular Science Monthly*, to whom Americans are indebted for his successful labors in rendering available to them much of the best scientific thought of the time, died during January last.

Prof. J. M. Madvig, the great Danish scholar, is reported dead at the age of 82 years.

CORRESPONDENCE.

THINKS HE WOULD LIKE IT.

In looking over a copy of the '*Curiosity World*,' I saw a notice of your paper THE WEST AMERICAN SCIENTIST. From the name I think I should like to be placed on your list. Please send me a copy and if I wish to subscribe will try to send you some other subscribers. *C. S. Hobbie.*

HAMPTON, IOWA.

LIKES IT MORE AND MORE.

I hope you feel well encouraged in your publication. I like it more and more, and think it most useful, especially for Pacific Coast Naturalists. I want to preserve and bind my copies.

Here let me say that it does not only "seem like romance," but it is the very thing itself, where Prof. Keep says that the *parents* of the late Isaac Lea, came over with William Penn, (vide Jan. number. WEST AMERICAN SCIENTIST, p. 25.) His father's name was James Lea, while the *ancestor* who came over with Penn was John Lea. Between John and Isaac Lea, several generations intervened. Sincerely yours,

Wm. M. Canby.

WILMINGTON, DELAWARE, Feb. 1, 1887.

SPECIMEN LETTERS.

Find postal note enclosed, for which please send to my address THE WEST AMERICAN SCIENTIST, as per your advertisement in *Naturalists' Companion*. Respectfully,

NEW SALEM, N. C., Feb. 8, 1887. *W. F. Moragne.*

I am pleased to acknowledge the receipt of your magazine. You may send THE WEST AMERICAN SCIENTIST for one year, for which I enclose draft on N. Y. for $1.00

WINFIELD, KANSAS, Feb. 4, 1887. *J. F. McMullen.*

FUNGI, MOSSES, ETC., WANTED.

I am desirous of obtaining correspondents in California, who will collect mosses, liverworts and fungi from your coast. Some one who desires to make a collection in any or all these lines, who is willing to collect largely. We will so far as possible, name specimens when sent in moderate quantities, and return a named set, or, if any one would take up the work with enthusiasm, would send in advance a named set to give them a start. We could, if desirable, send a few other things from this region, as shells, etc., in exchange. Can you help me in this line?

I am getting out a new edition of my "Ferns and their allies."

Yours truly,

L. M. Underwood.

SYRACUSE, N. Y., Feb. 7, 1887.

SEEDS WANTED.

I have taken the first opportunity, which my recovery from a long sickness has afforded, to renew my request for seeds of Darlingtonia California. I am strongly interested in all special or abnormal modifications of leaves, and would be deeply indebted to you for any information as to where I may be able to procure seed of the following: Sarracenia purpurea; S. variolaus; S. psittacina; Heliamphora; Cephalotus; Drosera; Dionea; Desmodium gyrans. *H. R. Grosjean.*

P. O. Box 1562, Terra Haute, Indiana.

[We received the promise last season of seed of Darlingtonia California, but our correspondent failed, and wrote, as an excuse, that no one had ever succeeded in growing it from the seed. As other correspondents are anxious to secure seed of this curious plant, we hope some of our readers will supply us. ED.]

METEORIC IRON WANTED.

Will purchase or take in exchange meteorites for fine crystalized and rare minerals. Intact falls, all the pieces of any fall, and newly found and undescribed ones especially desired. Also information wanted on the occurrence of American gems and gem minerals and American pearls, and facts in regard to, and specimens of American Amber from all known localities, especially if containing enclosures of wood, vegetable or other living matter.

Please mention this magazine in writing.

HOBOKEN, NEW JERSEY. *Geo. F. Kunz.*

SPECIMENS OF PALMS DESIRED.

I thank you much for the palm seeds you have sent me, and on my part, wish for an occasion of being useful to you. If you wish anything from Italy, I will be pleased to send.

It will aid me much in my studies if you can procure me as complete specimens as possible, at least of the leaves and flowers of these palms of which you have sent me seeds, [Erythea edulis and armata, and Washingtonia filifera], to which add, if possible, those of Washingtonia robusta.

I also wish to know if you have correspondents in the Sandwich Islands from whom you could ask for specimens of the two or three indigenous palms of those islands.

In the interest of the science that we cultivate, will you have the goodness to pardon me the liberty with which I have addressed you, and accept the assurance of my most sincere regards. *O. Beccari.*

ROYAL MUSEUM, FLORENCE, ITALY, Jan. 5, 1887.

HOW TO STUDY BOTANY.

I wish to consult you in regard to a matter, which, I think, will interest you as well as me

I have here a large school of intelligent boys and girls, who, living in all parts of the valley and adjacent foot-hills, have a very fine opportunity to see and collect the vegetable and floral products of the region, which I am sure are rich and varied.

So I have intended for some time to interest my school in Botany, and study the flora of the San Jacinto Valley, and collect a complete herbarium illustrating the same. The pupils could each day bring in the plants they find round about their homes; we could study them, classify them, preserve them, and by the end of the year, could make good progress in knowledge and herberium.

Can you tell me—

1st. What book or books can I get that will describe the plants I will find here?

Will Rattan's Text Book help me to determine the species in this country?

2d. What arrangement had I best use for pressing, drying and preserving specimens. Tell sizes, details, particulars, &c., &c.

There are hills, mesas, swamps, forests, cañons, lakes, valleys, mountains hereabout. Such a variety of conditions ought to yield a richly varied botanical collection.

Very cordially yours,

SAN JACINTO, CAL., Feb. 11, 1887. *Edward Hyatt.*

[The Botany of California, by Prof. Sereno Watson, in two large volumes, uniform with the Geological survey, form the standard authority on the flora of the Pacific coast, and cost $11 when ordered direct from the author, residing in Cambridge, Mass. For the commoner flowering plants, Rattan's "Popular Flora" will be convenient and useful. ED.]

PROCEEDINGS OF SOCIETIES.

VENTURA SOCIETY OF NATURAL HISTORY.—December 20, 1886. Dr. Stephen Bowers, on the Geology of Ventura County; Miss Anna Seward, on Gordii, or the horse hair snake; Miss Agnes Howe, on the Natural History of the Flea.

January 17, 1887. Rev. T. D. Murphy read a paper on the Myths of Montezuma.

SAN FRANCISCO MICROSCOPICAL SOCIETY.—January 12, 1887. Mr. Howard, on Diatomaceous Material from Arizona; Dr. Stallard on the discovery of Bacillus Tuberculosis in milk supplied by certain San Francisco dairies.

Prof. Edward S. Holden, the eminent Astronomer, and President of the University of California, was elected an honorary member.

Among the objects exhibited was a handsome mount by Thomas Clarke, Birmingham, England, of the rare and beautiful crustacean Leptodora hyalina. Until a few years ago it had not been found in Great Britain, and its first discovery there created considerable interest. It was found swimming among masses of minute alga (Clathrocystis æruginosa). Mr. Breckenfeld stated that some three years ago a small pond or reservoir in the Presidio contained the same alga in such prodigious quantities as to give the water the appearance of thick, green paint. Knowing this to be a habitat of Leptodora, he had specially searched for that organism, but without success. After some months the immense masses of Clathrocystis disappeared, and, strange to say, had not again been seen up to the present time.

January 26, 1887. D. W. Parkhurst was elected a resident member. Dr. Ballard reported from the committee on the alleged finding of Bacillus tuberculosis in milk supplied by San Francisco dairies. Drs. Mouser and Ferrer also spoke on the same subject. Mr. Howard exhibited a slide of Entermorpha intestinalis. A sample of diatomaceous earth, from near Santa Monica, was submitted by the State Mining Bureau.

February 9, 1887. The election of officers resulted as follows: E. J. Wickson, President; Dr. Henry Ferer, Vice-President; A. H. Breckenfeld, Recording Secretary; Dr. C. P. Bates, Corresponding Secretary; F. L. Howard, Treasurer.

The retiring President, Dr. S. M. Mouser, read an address concerning the progress of the Society. Mounted slides were presented by Messrs. Howard and Breckenfeld, illustrative of the diatoms of the coast.

February 23, 1887. Prof. Ashburner exhibited a slide containing 213 arranged diatoms, from a specimen of the earth found at Santa Monica by Mrs. A. E. Bush. Mr. Breckenfeld exhibited a slide containing a section of the intestine of a rabbit. The President proposed, as a subject for microscopal investigation would be, why popcorn pops, while other kinds do not.

A. H. Breckenfeld, Rec. Sec.

Humboldt Society of Natural History.—The Secretary writes us: "The Natural History society that we organized last year seems to have died of inanition. Causes: Members lived too far apart; President failed to call a meeting, etc., etc. We are taking steps to organize another, consisting of citizens of Eureka and vicinity." *Carl C. Marshall.*

California Academy of Sciences.—February 7, 1887. Dr. Behr stated that since the last meeting Dr. Hammond had donated

to the Academy some fossil shells and the tooth of a horse, found at a depth of 35 feet below the surface of Alameda creek. The Doctor said he was not enough of a paleontologist to determine whether these specimens, either the shells or the tooth, belonged to extinct species, or to species now living. An enormous ivory tusk, 11 feet long, and well preserved, of a mastodon, which was obtained from the natives of Alaska by Captain James McKenna, and presented to the Academy two years ago, has been placed in the museum, having been brought from the Merchants' Exchange, where it has been for two years past for the inspection of the ship captains and others.

Dr. C. M. Richter read a paper on the 'The Ocean Currents on the Western Coast of North America.'

Announcements were made of the following appointments by the Council: Publication Committee—H. W. Harkness, E. L. Greene, C. G. Yale, C. Troyer, George Hewston. Curators—Botany, M. K. Curran, E. L Greene. Ethnology, S. Wooster. Mammals and Birds, E. F. Lorquin, W. E. Bryant. Reptiles and Radiates, Rosa Smith, H. E. Lorquin. Geology and Paleontology, E. S. Clark, George Hewston. Mineralogy, Melville Atwood, C. D. Gibbes.

President Harkness exhibited some specimens of Certiceps hugelii, a remarkable fungus from Australia and New Zealand. He showed a species of caterpillar which never appeared above the surface of the ground, and from the head of which, after it died, springs a fungus growth having the appearance of a vine.

Dr. Behr read a eulogy on the late Isaac Lea, the first honorary member elected in the Academy, and a member of a number of scientific and other societies both in America and Europe.

The Secretary, Mr. Yale, stated that hereafter papers read before the Academy would not be considered as intended for publication, unless they were handed to the Secretary immediately after they were read.

EDITORIAL.

The Mineral Exhibit.—The collection of minerals and ores of Southern California, formed for Dr. A. E. Foote's representation of the mineral resources of the U. S., for the American exhibition to be opened in London on the 2d of May, is probably the best ever yet secured from this section. We are indebted for this success to Messrs. Wilcox, of Julian; McNamara, of San Diego; Banks, Hoff, Warson and others, of Elsinore; Chandler, of San Jacinto; Kent, of Barstow, and Ira J. Gray, business manager of The West American Scientist. The letter from Mr. Gray, given elsewhere, shows that the collection came near costing that gentleman dearly.

THE ROAD-RUNNER AGAIN.—We are informed that Andrew Farley, San Diego, has seen a road-runner corral a rattle-snake, and has also observed the bird while dropping pieces of cacti on the snake's head. *Science Series* gives an account in a recent issue of the war carried on between these animals.

THE AGASSIZ ASSOCIATION.—Some time ago, Prof. H. H. Ballard, president of the Agassiz Association, requested our assistance in organizing branches in Southern California, and, if possible, to form a state assembly. We hoped to have brought the subject before the teachers' institute of San Diego County, but absence from the city at the time of its meeting prevented. We re-produce in this number extracts from the history of this association given in the initial number of the *Swiss Cross*, its new official organ. For further details we would advise those interested (and we trust there are many), to send for the hand-book of the association, the purchase of which is the only expense to be incurred by new chapters joining the society. This little book (price 54 cents) gives a great amount of information and valuable hints about collecting, making cabinets, etc., and is invaluable to the young student of nature. We hope this may result in the formation of many chapters of this useful institution, after which an assembly may be proposed.

OUR CONTRIBUTORS.—We wish to introduce to our readers some of those who have, and who have promised to contribute to these pages.

On botany, the well known Dr. C. C. Parry, of Davenport, Iowa, was our first; then D. Cleveland, Esq., the earliest resident botanist of San Diego; Prof. E. L. Greene, of the University of California; Dr. Geo. Vasey, botanist of the U. S. Dept. of Agriculture at Washington.

On entomology and ornithology, Frank E. Blaisdell and L. Belding.

On zoology, Prof. Josiah Keep, author of the charming 'Common Seashells of California'; Prof. Geo. R. Kleeberger, Prof. Carl C. Marshall, Miss F. E. Fish, Miss Rosa Smith (on icthyology), and various others.

Mrs. Z. R. Cronyn, A. M., one of Agassiz's students, was among our earlier contributors; Geo. F. Kunz, the well known authority on minerals and gems, has promised to keep us posted in the news of his department; W. S. Lyon, of Los Angeles, may be expected to contribute in the future; Ira J. Gray gives us his views and experiences; poetry by Mrs. C. K. Smith and Mrs. Z. R. Cronyn has appeared, and the pen of 'E. E.' will continue to furnish her latest poems.

We invite all to contribute to our pages and ask for the universal support of the naturalists of West America in our endeavor to produce a journal worthy of their activity in the cause of science.

NOTES AND NEWS.

Germanium is an addition to the list of known elementary substances, discovered by Dr. Clemens Winkler, a German chemist. It exists in combination with silver and sulphur in argyrodite, a new mineral.

Coffee trees nearly seven feet in height, of rapid development and very productive of berries, that resemble in appearance and flavor those of Arabia, are reported from West Africa. Experiments will be made at once in its cultivation in favorable localites.

At Yakutsh, Siberia, it is estimated that the ground is frozen to a depth of over 600 feet. A well, was many years ago, sunk to a depth of 382 feet, without penetrating the frozen ground.

Reindeer hair and skin possess remarkable buoyancy. and when the unshorn skin is used as a life belt, it has the advantage over cork of warming the wearer while in the water. Suits of the weight of a pound may keep a man from drowning, while it furnishes greater protection from cold than oilskin or other materials.

An electric machine takes the place of the old ruler in a Swiss school for the punishment of pupils.

A bluish green glow about the top of Mount Blanc, sometimes visible till 10:30 P. M., has been observed by M. Zengler, who concludes that it is due to the mingling of ice and carbonate of lime.

It is estimated that not less than five hundred periodicals have discontinued publication during the past year. Perhaps a third as many more have been started in the same period.

Canada is to have a new postal card design.

The new U. S. postal card is a decided improvement on the older designs.

Geo. F. Kunz, of New York, has promised to contribute to the SCIENTIST. His eminence as an authority on gems and minerals, will render the contributions from his pen of value as well as entertaining.

Ventura County is still largely unexplored scientifically, says the *Pacific Science Monthly*. The same might be said of each of our southern counties as well.

The first brick house built south of Point Conception, is said to be one in Old San Diego, built in 1856.

Several years ago, several gentlemen in Old San Diego placed a few bottles of honey under the eaves of adobe an house. Later they desired to use it, but found the corks had been eaten away and that all the honey had disappeared. They laid the theft to the rats, who they supposed had extracted the liquid by dipping their tails into the bottles. We would advise them to inquire of the ants for the honey.

LITERATURE.

A catalogue of the known plants (Phaenogamia and Pteridophyta) of Oregon, Washington and Idaho, by Thomas Howell, has been received from the author. Among the 2,379 kinds of plants enumerated are many of our San Diego plants, including Bromus Orcuttianus, Vasey, first discovered on Smith's Mountain in this county.

An analytical key to West Coast Botany, containing descriptions of 1,600 species of flowering plants, growing west of the Sierra Nevada and Cascade crests, from San Diego to Puget Sound, has just been published by A. L. Bancroft & Co.. of San Francisco, from the pen of Volney Rattan. It is intended as a preliminary to the author's proposed West Coast Botany, which will probably be completed in three years.

Transactions of the Meridan (Conn.) Scientific Association, Volume II, is at hand, showing that an unusual proportion of its members are active.

Valuable publications have been received from Hon. E. M. Goodwin, Hartland, Vermont; Massachusetts Horticultural Society, Boston; California State Board of Forestry; Dr. Gustave Eisen, Fresno, Cal; Dr. Lorenzo G. Yates, Santa Barbara; Dr. C. C. Parry, and others.

The *Pacific Science Monthly* is to be issued in the future as a bulletin of the Ventura Society of Natural History, bi-monthly, quarterly, or as occasion may demand.

The *Golden State Scientist* has reached our table but once, and other tables have fared the same. We learn the encouragement it received was insufficient to enable the publisher to continue, and that he returned the money received for subscriptions.

The *Milwaukee Naturalist*, it is announced, proposes to die.

The *Swiss Cross* has entered the field as the official organ of the Agassiz Association, to be issued monthly at $1.50 a year. The first (January) number is at hand, consisting of forty pages. It is uniform in size with *Science*, the weekly journal.

The *Golden Era*, the oldest literary magazine in the West, will hereafter be published at San Diego instead of in San Francisco, where it has been issued for thirty-five years. It is fit that the oldest city in California should possess the oldest literary journal on the coast, as well as the oldest scientific magazine.

The February *Century* contains an interesting article on the winter resorts in the Bahamas; a continuation of 'Abraham Lincoln,' a history; a sketch of the new Astronomy, 'the Stars' by S. P. Langley, and an account of recent discoveries of works of art in Rome. Edward Atkinson contributes his second paper on the relative strength and weakness of nations, equally as strong as his first.

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VOLUME III. APRIL, 1887. WHOLE NO. 24.

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C. R. ORCUTT, - EDITOR.

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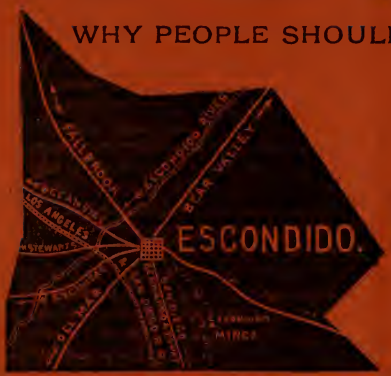

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THE WEST AMERICAN SCIENTIST.

VOL. III. APRIL, 1887. No. 24.

COLLECTING IN THE CAPE REGION OF LOWER CALIFORNIA.

But few persons are aware that much of Lower California is, at this late day, a veritable Terra incognita.

Much of it has not been explored by the Naturalist, to whom it is likely to long remain a land of interest. Xantus made large collections in the neighborhood of Cape St. Lucas, during the three years he spent there, which terminated about twenty-seven years ago, and the writer collected at La Paz and southward from about December 1st, 1881, to May 20th, 1882, and again in the winter of 1882–83, but from La Paz northward to the boundary line, a distance of about six hundred English miles, the most of the Peninsula is still unexplored, the small collections which have been made immediately on its west coast, at Cerros Island, Santa Rosalia and San Quentin Bays, furnishing little or no evidence of the fauna of the mountain ranges of the interior. The fauna from La Paz south, is nearly related to that of the Colorado Desert, to parts of Arizona and Sonora, and the flora of all bears a general resemblance, the most characteristic plants being the Giant Cactus, Mesquite and other pod bearing trees.

The Cape Region, as that part of the peninsula from La Paz south may be termed, has, however, a considerable number of species peculiar to itself, including fourteen species and varieties of land birds, besides one wading species, a rail, and several species of reptiles. How much north of La Paz the "Cape species" are dispersed, can only be determined by future explorations. Scarcity of food and water for man and horse, are the chief difficulties the explorer has to contend with.

The absence of wagon roads, except in the northern part and near La Paz, few trails and thorny vegetation add materially to the difficulty. To say that every plant bears thorns, and every insect a sting, would be to exaggerate, but there is foundation for the saying.

Venomous serpents and insects are numerous, and must be guarded against, though not especially dangerous. The "Zorillo"

or small skunk, (Mephitis putorius,) is more dreaded by Mexican residents than all the other "vermin," as Father Bægert named them, it having a penchant for biting a sleeping person in the face or other exposed part, and its bite causes hydrophobia or something akin to it. Of this I was for a time skeptical, but I obtained so much testimony, that I became convinced of its truth.

I was told at La Paz, that the bite of the skunk was not harmful north of about latitude 25°.

My greatest misfortune while in Lower California, was that I was stung about a dozen times by the "Allikranz" or scorpion, my greatest annoyance, that caused by the numerous fleas. Cockroaches and ants would persist in getting in my drinking water, especially at San Jose del Cabo, where the fleas were also most troublesome, until I learned to keep the water in bottles.

The Cockroaches were marvels of their kind, being about two inches long and stout in proportion.

Of the ants there were several species, and each was numerously represented.

When camping in the country, I was careful to camp in sandy arroyos, shunning rocky ground for fear of reptiles and the skunk.

The Mexicans usually keep dogs about their camps to protect them from the latter.

Scorpions sometimes dropped from the palm thatched roofs of the dwellings on my bed, and occasionally I would find them in my garments, where they had secreted themselves during the night, but after one painful experience, I examined the garments with due caution every morning, and never neglected to invert my boots and shake them.

The Mexicans were always kindly and hospitably inclined, and when stopping at a strange ranch for a night, I made it a rule to place my gun in charge of the proprietors, and I never had cause to regret the confidence I reposed in them. The Custom officials always accepted my statements as to the contents of my packages, and would politely decline to inspect them.

Professor Baird, the able director of the National Museum and Smithsonian Institution, for which I was collecting, advised me to pay special attention to the reptiles of Lower California, informing me that Xantus found many interesting species, among which were two very interesting species of rattlesnakes, and that I too would be likely to discover new ones. With appropriate zeal, I endeavored to follow his advice, and was fairly rewarded for my efforts, though collecting and caring for the specimens was anything but pleasant, and an uncertain degree of danger was involved in it.

Fortunately, when I arrived at La Paz in December, the Messrs. Gaston Brothers were having new ground, about three miles west of La Paz, spaded for a garden, and upon learning that their laborers often unearthed hibernating reptiles of various kinds, I lost

no time in contracting with the laborers for a general assortment of reptiles, scorpions, centipedes, tarantulas, etc. About half of the species I got from La Paz, came from that garden of two or three acres, and among these was a lizard, an individual, which Dr. Yarrow described under the name of Crotaphytus copei, and which is the only specimen of its kind, as I did not find it elsewhere. The reptile crop of that garden was prodigous, though I took only a small part of it, as I wanted only a few individuals of each species.

Probably it was about an average yield for that part of the peninsula. One day while at the garden, I lay down by the side of the cabin to rest, using a saddle that lay there for a pillow. After sleeping a few minutes, I arose, and soon after found a large Diamond rattlesnake coiled beneath it. I was not greatly startled by the discovery as I had previously been. on more than a dozen occasions, within the striking distance of rattlesnakes, without their attempting to harm me. Mayor Pond, of San Francisco, had about such an experience as the above, when we were fishing on the Stanislaus River, a few years ago, except that his pillow was a trout basket, and his snake did not remain until he finished his sleep.

Our revolutionary forefathers were evidently acquainted with this reptile, as they placed the figure of one on their flag with the motto, "don't tread on me or I will bite" Rarely, however, an individual will behave in an unaccountable manner. One that I met with in the mountains of Pennsylvania, when a boy, has been a life long puzzle to me, and I have never been able to decide if it was trying to "charm" me or if I charmed it. As I shot its head off. and dimmed its piercing, glistening eyes forever, after it had steadily, slowly and silently approached to within three feet of me, its impulses can never be known. Perhaps it was a "crank." I use the word crank with much hesitation, for since the death of the criminal Guiteau, I have heard it used in various connections.

A single example will sufficiently explain why I hesitate to apply the name to a dead rattlesnake. When I was in Sierra Valley, in the summer of 1885, I enquired about a distinguished botanist, of whom I had often heard but had never met, and a lumberman said he was a crank, giving as a reason for the assertion, that "he did nothing but go about the mountains gathering weeds." This man was like a few more of our enterprising people, who think the chief object of life is to gather dollars and cents, and surround themselves with "gew gaws." (A friend who resides in this town, tells me "a great many people in San Diego have the Natural History Craze.")

Besides the specimens obtained in the garden, I increased the number of species by visiting all sorts of places, and by the middle of March, I was happy in the belief that I had nearly duplicated

Xantus' notable collection of reptiles and birds, besides adding a few new species; but I was most pleased to know that I had ascertained that the "Cape Species" were by no means confined to the Cape, and this accorded with my belief, based upon my first critical survey of this part of the peninsula from a steamer's deck. I brought Uta thalassina from Cliffs near Playitas, Sauromalus ater from Espiritu Santa Island, Sceloporus rufidorsum from igneus rocks, east of La Paz, and the new toad was first found in a well at Infirmaria Bay.

I was alone when I went to the bottom of the well, as my boatmen were on the bay diving for the beautiful but frail Coral found in Infirmaria Bay, and I was somewhat nervous when I descended the well, as I might need help in getting out, and if I could not get out I might never be found; but after a careful survey, I rightly conjectured that I could safely descend. Some of the specimens I carried in my saddle pockets and fish basket, at least three days before putting them in alcohol, but I was careful to inject a little preservative which was usually a solution of Chloride of Zinc. A few specimens I got at Laguna, in the Victoria Mountains, were thus preserved, rolled up in cotton and forwarded to Washington for identification, and I suppose they reached their destination in fair order, as I never heard to the contrary. I kept the most of the alcoholic specimens in large Mason fruit jars, next to the wall of my only room, where I saw them early and late, and often examined them to see if they were doing well. Handling the specimens before breakfast, as I invariably did, did not increase my appetite for it, and a repetition of the same just before retiring at night was not conducive to pleasant dreams, but lest I weary the reader with too much detail, I will say briefly, I went from La Paz to Cape St. Lucas, San Jose del Cabo and other localities, and added a few species to those already collected, as the San Jose River supplied several not found elsewhere.

This is the only river south of La Paz, and it is so small in winter, in the dry season, that it hardly deserves the name of river. In summer, the wet season, it is much increased in volume, as I judged from traces of its deposits of drift. The wear and waste of the granite rock is apparently very rapid in Southern Lower California, as the canyons are full of granite sand, and much of the surface of the country is covered with it.

While I was travelling alone across the peninsula, from the Pacific Ocean to La Paz, in 1883, I saw enough to convince me that the portion of the peninsula from La Paz south had, until a comparitively recent date, been an island.

This would in part account for the origin of the "Cape Species." The distribution of species, and especially of fossils, will ever be of great interest to the Naturalist.

The distribution of reptiles is much more significant of geological changes than that of birds and animals, and we may reason-

ably conclude, because the reptiles of the Coronados, and most other Pacific Coast Islands, are similar to those of adjacent parts of themain land, that these islands were formerly connected with and were a part of the main land, though we cannot be positive that such was the fact.

A comparison of the reptiles of the southern and northwestern portions of the peninsula, shows great difference in genera and species, though a few are common to both.

Some of the birds of the Cape region should be found between San Diego and La Paz, while others are probably but local. Certainly, the peninsula presents rare opportunities for the energetic, intelligent explorer. *L. Belding,*

San Diego, March 20, 1887.

REPTILES OF THE CAPE REGION OF LOWER CALIFORNIA.

The following is a list of the reptiles I collected in Lower California, the majority of which were also found by Xantus. My specimens were identified by Dr. H. C. Yarrow, Honorary Curator of the department of reptiles in the United States National Museum:

1. Pseudemys ornata, Gray. Found only in the San Jose River.

2. Chirotes canaliculatus, Cuvier. Said by the Mexicans to be dangerous. I doubt their absurd tales concerning this.

3. Cnemidophorus maximus. Cope. "Verico," "Axotle" of the Mexicans of Lower California.

4. Verticaria hyperythra, Cope.

5. Gerrhonotus multicarinatus. Baird and Girard.

I found this in the south only above 3,500 feet altitude. Also on the Coronado Islands.

6. Calisaurus dracontoides, dracontoides (Blainv), Cope. *Cachura de la arena* or "Sand Lizard." I found this also at Real del Castilla, in the northern part of the peninsula, 95 miles south-east of San Diego.

7. Sauromatus ater, Dumeril. Only found by me at Espiritu Santo Island and at Guaymas. Dr. Streets (Bull. U. S. Nat. Mus. No. 7) found it on Angel Island, several hundred miles north of Espiritu Santo. It will probably be found on the Gulf Coast of the peninsula north, if not also south of La Paz, though the Aborignal tribes may have planted them on these islands after obtaining them in Sonora or Arizona.

8. Crotaphytus Copei, Yarrow. A new species.

9. Dipsosaurus dorsalis, Baird and Girard. *Cachuron,* of the Mexicans. Small lizards are called *Cachuras* or *Cachuritas.*

10. Uta thalassina, Cope. On cliffs near fresh water in several localities, at Playitas, San Lazaro and in Victoria Mountains. The *Cachura verde* or "Green Lizard" of Lower Californians.
11. Uta nigricauda, Cope.
12. Uta schotti, Baird.
13. Uta elegans, Yarrow—a new species.
14. Uta ornata, Baird and Girard.
15. Uta stansburiana, Baird and Girard. Also on Cerros Island.
16. Sceloporus rufidorsum, Yarrow. A new species. In life it is highly colored, the back having coppery-red metalic reflections instead of rufous. It fades in alcohol. The Mexicans' name for the Sceloporæ is *Vijore*, (pronounced ve-ho-re)
17. Sceloporus clarki zosteromus, (B. and G.), Cope.
18. Sceloporus consobrinus, Baird and Girard.
19. Phrynosoma cornutum, Harlan. Horned Lizard; two species.
20. Phrynosoma asio, Cope.
21. Cyclura hemilopha, Cope. This and the two following called *Iguana*, without distinction.
22. Cyclura teres, Harlan.
23. Cyclura acanthura, Shaw.
24. Phyllodactylus xanti, Cope. This and the following species are known by the name Zalamanquesa. The Lower Californians say that they are very poisonous; that if they crawl on one's flesh it decays. They often frequent dwellings.
25. Diplodactylus unctus, Cope.
26. Crotalus mitcheli, Cope. Apparently very rare, as is also the following species; neither as yet found north of La Paz. Both good species. *Vivore con cascabel* is here the Mexican name for the rattle-snake.
27. Crotalus enyo, Cope.
28. Crotalus adamanteus atrox (Beauvois) Cope. Very abundant.
29. Chilomeniscus stramineus, Cope.
30. Chilomeniscus cinctus, Cope.
31. Ophibolus getulus boyli (Linn), Cope.
32. Hypsiglena ochrorhyncha, Cope.
33. Trimorphodon lyrophanes, Cope.
34. Phimothyra grahami, Baird and Girard.
35. Phimothyra decurtata, Cope.
36. Pityophis vertebralis, Blainville. Mexican name *Coralillo* (pronounced Coral-e-yo.)
37. Bascanium flagelliforme testaceum (Catesby), Cope.
38. Tropidonotus validus tephropleura (Kennicott), Yarrow.
39. Lichanura trivirgata, Cope.
40. Stenostoma humile, Baird and Girard.

41. Bufo punctatus, Baird.
42. Bufo beldingi, Yarrow. New species.
43. Hyla cuita, Cope.
44. Hyla regilla, Baird.
45. Scaphiopus couchi, Baird.

To these should be added the following which were collected by Xantus (Yarrow Bull. Nat. Mus. 24):

46. Eumeses skiltonianus, Baird and Girard.
47. Bascanium aurigulum. Cope.
48. Tropidonotus validus validus (Kennicott), Cope.
49. Tropidonotus validus celæno (Kennicott), Cope.
50. Eutænia cyrtopsis, Kennicott and
51. Phrynosoma coronatum, Blainville, by J. H. Clark.
52. I saw at Guaymas a Leather-back Turtle (Dermatochelys) which weighed 1,102 lbs. I noticed other marine species in the Gulf not here mentioned, and also three species of water-snakes in or near the San Jose River which I did not collect.

I found in the Spring of 1881 at Cerros Island and San Quentin Bay, besides other species already mentioned—

52. Cnemridophorus tessellatus melanostethus (Say), Copee.
53. Sceloporus clarki clarki (Baird and Girard), Cope.
54. Phrynosoma hernandezi, Girard.

Dr. Yarrow, Bull. 24, mentions other species of Lower California reptiles as being among the desiderata of the National Museum, namely, Tantilla planiceps, Blainville. Ophibolus Californiæ, Blainville. Eutænia cyrtopsis ocellatus (Kennicott), Cope. Charina bottæ, [Found in San Diego County, south. Ed. West American Scientist.] Plethodon croceator, Cope. Scaphiophus varius rectifrenis, Cope.

No. 33 is said by Mexicans to be very poisonous, as it often enters dwellings, getting on and in beds. It is much feared. I believe Dr. Yarrow told me that it is harmless.

No. 43 I found at San Quentin Bay and on Cerros Island, but it was only in the mountains in the Cape Region.

L. Belding.

THE ORIGIN OF ALCOHOL.

According to the 'Talmud,' one theory concerning the origin of alcohol is as follows:—Noah planted the first vineyard, Satan being present and assisting in the work. After the vineyard was planted Satan slew a lamb, a lion, an ape and a hog, and with their mingled blood watered the roots of the vines. This he did, he said, because he who shall taste for the first time the juice of the grape will be a lamb; he who shall use it in moderation will become—for the time being—a lion; he who shall use it to excess will become an ape, and he whom it shall master will become a hog. *W. B. Davis, in the Epitome.*

A MUNIFICENT GIFT.

The Directors of the San Diego Society of Natural History met March 3d at the office of Dr. G. W. Barnes. Messrs. Cleveland, Puterbaugh, Capron and Barnes were present. A letter was read from E. W. Morse and his wife Mary C. Morse, offering to the Society the title in fee simple to lot 1, block 17, Horton's addition. This property is situated on Sixth street near E, a few yards above the magnificent new Pierce-Morse Block, and not a block from the Postoffice and THE WEST AMERICAN SCIENTIST office. The gift was offered upon certain conditions. The Society is not to mortgage the property without first obtaining the written consent of the donors. A suitable building is to be erected on the lot at the earliest possible opportunity, and at not a later time than three years from the date of conveyance. This building shall contain collection rooms a place of meeting for the Society, and a public hall which shall have a capacity of seating at least 200 persons. In this hall free lectures on scientific and popular subjects shall be delivered as often as is practicable. The hall shall be open to all legitimate public uses, and shall especially be always at the service of the Society for Improving and Beautifying San Diego. The Directors unanimously accepted the gift upon the specified terms, and pledged that all the conditions of the donation shall be kept in good faith. Also declaiming that it was both to the honor and interest of the Society to erect, as soon as possible, a suitable building. Resolutions expressive of gratitude to the donors, and appreciation of the donation, were adopted and ordered to be presented to Mr. and Mrs. Morse. The Society now has a small building upon the lot. The gift is of the value of at least $12,000.

EDISON'S PHONOGRAPH.

Edison, the inventor, has a remarkable memento of Beecher at his house in Llewellyn Park. His phonograph for impressing on a soft metal sheet the utterances of the human voice, and then emitting it again by the turning of a crank, has never been put to any practical use, but he has utilized it to make a collection of famous voices. Since he became famous, visitors have included hundreds of celebrities. Instead of asking them for their autographs or photographs, he has, in two or three hundred instances, requested them to speak a few sentences into a phonograph. He has kept the plates in a cabinet, and occasionally he runs them through the machine, which sends out the words exactly as uttered. Edison is probably the only man who can revive the silenced voice of the great preacher.

*HER PHOTOGRAPH.**

A picture of a dark-eyed girl
With pensive, thoughtful air,
Whose pure sweet face looked from beneath
Its frame of misty hair.

My heart was captured by her face;
I loved her at first sight:
'Sweet maid,' I whispered, 'let me be
Your own true chosen knight.'

And then I tried to find my queen,
I sought her near and far;
Her pictured face shone on my path
And was my guiding star.

But oh, how can I tell the grief,
The bitter grief to me,
When I found out beyond a doubt,
There wasn't any *she!*

For this sweet picture that I loved
(Kind reader, do not laugh!)
Turned out to be a very good
Composite photograph!

And the fair girl whose pensive eyes
Had made my pulses stir,
Did not exist, or rather there
Were forty-nine of her!

One woman's face was in my mind—
How could I then divine
That I, while faithful to one love,
Was true to forty nine?

Oh Science! You have done this thing,
On you I lay the guilt;
You've made my honest love appear
Like any crazy quilt!

And this one thing I ask of you,—
Can you, with all your art,
Unite these forty-nine poor bits
And give me back my heart?

Bessie Chandler, in the Century for April.

* See Composite Photography, in *The Century*, for March.

NECROLOGY.

William Cross, of Glasgow, a famous shawl manufacturer, a man of letters, an artist and a poet, died lately in his 82d year.

George Crompton. distinguished as an inventor of many improved looms, died at his home in Worcester, Mass., Dec. 29, 1886, aged 55 years.

Hilborne L. Roosevelt, an eminent organ builder, electrician and inventor. died at his residence in New York., Dec. 29, 1886, aged 36 years.

Dr. William Perry, died Jan. 11, 1887, aged 98 years. He was the sole survivor of the passengers on Fulton's first steamboat-ride down the Hudson.

Prof. E. L. Youmans, mentioned in the WEST AMERICAN SCIENTIST for March, died Jan. 11, 1887.

Louis Bazille died in Montpelier, France, Nov. 25, 1886. Noted for the useful results of his studies of grape culture.

Jules Lichtenstein. noted for his horticultural and entomological studies, departed this life Nov. 30, 1886.

Sir Joseph Whitworth, an English inventor, died Jan. 22, 1887, aged 83 years.

Dr. S. A. T. Tuelberg, a Scandinavian botanist, died Dec. 15, 1886, aged 34 years.

Rudolf von Uechtritz, chiefly known for his studies of the Silesian flora, died Nov. 21st last, aged 48.

Don Francisco Loscos y Bernal, a Spanish botanist, died in last November, aged 63.

Father Scortechini, a well known Indian botanist, recently died at Calcutta.

Marshall P. Wilder, well known to all plant cultivators, died Dec. 17th last, aged 88.

HYDRATION OF WOOD.

From a series of experiments which he has made upon the amount of water contained in highly lignified plants, in various seasons and under varied conditions of growth, Professor D. P. Penhallow has drawn the conclusions that the hydration of woody plants is not constant for all seasons, and depends upon condition of growth; that it reaches its maximum during the latter part of May or early June, and its minimum during January; that it is greatest in the sap-wood and least in the heart-wood, and that the greatest hydration is directly correlated to the most active growth of the plant, while lignifications and storage of starch and other products are correlated to diminishing hydration.—*American Analyst.*

CORRESPONDENCE.

A CORRECTION.

I notice some errors in the report of the Santa Barbara Society of Natural History. The membership is 45 instead of 21, as at the commencement. The number of volumes in the library, including pamphlets, is about 2,700.

Our society is figuring to publish their first Bulletin soon, and I will send you a copy when it is completed.

Mrs. R. F. Bingham, Corr. Sec.

SANTA BARBARA, March 5, 1887.

A SPECIMEN LETTER.

I enclose $1 00 as subscription for THE WEST AMERICAN SCIENTIST for the year 1887. I hoped to have been a denizen of your sunny clime ere this, but as any immediate prospect of such a longed for change is uncertain. I find it a consolation merely to learn at second hand of your wonderful country and its marvelous opportunities, scientific and otherwise. Yours truly,

HANOVER, MASS., March 7, 1887. *W. L. Foster.*

FIRST SAN DIEGO CHAPTER OF THE A. A.

Mr. Hyatt, our teacher, desires me, as Secretary of our Agassiz Association, to notify you that a chapter was organized in the Higher Department of our school, March 12, 1887. We hope to enjoy the benefit of your counsel and assistance from time to time when we get puzzled. Very respectfully yours,

SAN JACINTO, CAL. *Allie Harrington, Temporary Sec.*

THE PERICUE INDIAN DRESSES.

Not remembering when my subscription ends, I send $1.00 to renew the subscription to the WEST AMERICAN SCIENTIST.

I am much interested in finding out the plants utilized by Indians, and call upon you for information regarding the plant products mentioned in the following:

"Female dresses of the Pericue Indians of the peninsula of California are composed of leaves, of reeds or bulrushes, palms, canes, and threaded together by connecting strips with a binding on top edge. One of these will cover from the shoulders to the waist. Another of these dresses is composed of two pieces, each of about two feet square which is tied around the waist; the back part falls down like pieces of ribbon to the middle of the calves and covers the posteriors also The front part hangs from the middle to the knees. A certain kind of palm which grows plentifully in many parts of the peninsula of California makes a thread of great whiteness and strength, and which is used largely by the Indians and their women for various purposes." *California Farmer, No. 64, December 6, 1861.*

Have you seen any of these dresses among the California Indians? If you come across any of the plants above mentioned

please get specimens so that they may be identified, unless you know the specific names.

WASHINGTON, March 15.

[The above letter was without signature or other address than here given. We trust to hear from the party again, and will give such information as we can in future numbers on the subject. Readers who can give any facts are invited to do so. No dresses, as described, are known to us. The Pericue Indians formerly occupied the southern part of the peninsula, but have now entirely disappeared, leaving small trace of their customs and arts behind. The flora of the region occupied by them is imperfectly known. In the northern part, the different species of tule, Juncus robustus and similar plants, are utilized by the Indians to a small extent. The palm producing the white strong threads is beyond question Washingtonia filifera, the California fan palm, abundant through a large part of the peninsula .ED.]

A PROMISING SOCIETY.

Enclosed please find $1.00 greenback with which please credit me on my subscription to THE WEST AMERICAN SCIENTIST.

As you by this time know I have taken your advice in regard to Agassiz Association—we have a live society of 35 members which is going to be a great and a grand good thing for my school. They have begun to interest themselves in Entomology, Botany and Mineralogy, have decided upon a grand collecting picnic for an early date, have begun to lay plans for concerts and exhibitions for the purpose of "raising the wind," and together have received a new impetus toward good things and away from bad things. We hope soon to subscribe for a number of periodicals, your SCIENTIST to head the list of course.

Have you a copy to sell or lend of the SCIENTIST describing Trap Door Spider? We have found a famous locality for them and want to learn more about them.

Very hastily but cordially yours,

SAN JACINTO, March 30, 1887. *Edw. Hyatt.*

PROCEEDINGS OF SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY.—March 9, 1887. The subject appointed for discussion, viz, Bacillus Tuberculosis in Fowls, was introduced by Dr. Stallard, who said that the close analogy existing between certain diseases found in many domestic animals and the human race had long been known, as was also the communicability of such diseases. Rabies was a case in point, and, in a lesser degree, the disease known as anthrax or charbon. It is a known fact that typhoid fever has been transmitted from animals to man by means of infected milk. In connection with this subject he desired to call attention to the follow-

ing occurence: When convalescing from sickness recently, he had ordered a broiled chicken. While preparing it for cooking his wife noticed peculiar spots on the liver and spleen and showed them to him. As they were apparently tubercular, he placed them in preservative fluid until his recovery, when, upon chemical treatment and microscopical examination, the material was found to be crowded with true tubercular bacilli. The liver and spleen were especially infected, but bacilli were also plentifully found in the mesenteric glands, the lungs and other parts. He had thereupon made inquiries among the cooks of several large hotels and boarding-houses, and was by them supplied with material for further investigation. In the short time that he had been studying the matter he had found six chickens, all very badly infested with the bacillus in question, and he believed that probably 5 per cent of all the fowls offered for sale in this city were similarly affected. It was true that most of the organs thus affected were not used for food, yet, this was not always the case. Danger to the human race of infection from this source was greatly reduced, from the fact that the thermal death-point of the bacillus tuberculosis was about 150° Fahrenheit, so that in the process of cooking thoroughly they would be destroyed. A much higher temperature, however, is required to kill the spores of these bacilli, and, as there could scarcely be a doubt of the existence of spore-bearing bacilli in the chicken, it could not be said that danger from this source did not exist. While, therefore, by no means wishing to assume the role of alarmist, the speaker wished to commend the subject to microscopists and the medical fraternity, for its interest as well as its importance. Specimens of infected organs of chickens were shown, and mounted slides, showing the tuberculous matter and the bacilli themselves, all stained by chemical re-agents, were shown under a number of microscopes. A set of slides illustrative of the subject was donated to the society by Dr. Stallard, and a vote of thanks was thereupon tendered him for his donation and his interesting address.

Two interesting slides of native wire copper from Lake Superior were handed in by Dr. Selfridge.

As an instance of the brilliance with which many animal integuments are displayed by the use of polarized light, the Secretary exhibited a carbolic-acid mount of the human flea and also a slide of a rare marine crustacean from the Channel Islands.

March 23, 1887. The committee to which was referred the subject of tuberculous milk, asked to be discharged, as from the great difficulty of finding suitable material, it was almost impossible to proceed further in the matter at present. In the specimen of cow's lung which had been submitted as containing bacilli, none had been detected.

A valuable addition to the society's already extensive library was made by the receipt of over thirty volumes of publications of

the Smithsonian Institution, including all those bearing upon Microscopy. A special vote of thanks was tendered Congressor his good offices in procuring this donation.

A very h[illegible]ecimen of crystallized sulphate of baryta, from Derbyshire, [illegible]ngland, was received from Thos. Clark of the Birmingham Natural History Society. It bore a most remarkable resemblance to a transverse section of a vegetable stem.

Mr. Howard showed specimens of Noctiluca miliaris, the interesting little organisms to which is mainly due the well-known "phosphorescence" of the ocean. The gathering (which was a very plentiful one) also contained numerous specimens of the rare Leptodiscus medusoides (Hertwig), an organism allied to Noctiluca, but distinguished from the latter principally by the entire absence of any transversely-striated tentacle, and by the very regular reticulate appearance of the contained protoplasm.

A block of diatomacious earth, sent by R. E. Wood of St. Helena, for examination, was referred to Mr. Howard.

On motion, the Chair appointed a committee to consider the matter of printing annual reports, and also of making the exhibiting of attractive slides a regular feature of each meeting, after the disposal of the routine business.

A slide of arborescent silver crystal was handed in by Dr. E. S. Clark. A slide of native gold crystals from quartz, also mounted by him, was of unusual beauty.

Reference was made to the newly discovered deposit of fossil diatoms at Oamaru, New Zealand, which is attracting much attention at present in microscopical societies by reason of its great richness and the large number of forms entirely new to science found therein. A slide of this beautiful deposit was examined.

. Santa Babara Society of Natural History, February 26, 1887. R. F. Bingham, on the Honey producing qualities of the Eucalyptus; H. C. Ford, on fossil botany and the advantages of its study, and notes on the Northwestern fish crow; Hon. John Doan Cayton, an address on scientific matters.

California Academy of Sciences.—February 15, 1887. Dr. H. H. Behr, on the power and adapation of insects; Dr. H. W. Harkness, on fungoid growth affecting the sycamores.

March 7. Dr. C. C. Parry, Alders of the Pacific Coast; Mary K. Curren, Lichens of the vicinity of San Francisco.

March 21—A curious piece of sandstone, having the impression of a fig leaf upon it, from San Diego county, was presented by John Dolber. F. L. Clark, on the recent eruptions of Mauna Loa, S. I.; J. G. Cooper, on the West Coast pulmonata fossil; Geo. Davison, Occultation of the stars; H. W. Harkness, Pacific Coast fungi. The secretary and librarian tended their resignations.

Geographical Society of the Pacific.—January 18th, 1887. Kosmos, the new monthly journal, edited by the sec-

retary, was adapted as the official organ of the society. Chas. N. Bell communicated a paper on "Mounds in the Canadian North West". The annual election of officers occurred, followed by the reports of officers and committees.

February 15, Correspondence regarding the geographical location of Mt St. Elias was read. Prof. George Davidson, the president, gave a description of the "Boundaries of the territory of Alaska".

EDITORIAL.

San Diego Society of Natural History.—We are pleased to record the handsome present of Mr. and Mrs. E. W. Morse to this society, which places the association among the wealthiest scientific societies in the United States. It is to be hoped that it may be followed by increased activity among its members.

Composite Photography.—Photography is making rapid strides and proving of incalculable value to science Those who have seen the fine composite pictures presented to the readers of Science and the Century, will appreciate the poem that we reproduce this month from the latter magazine. "Rough, shadowy in outline, yet, they are distinctly human and attractive," is the universal verdict in regard to these pictures, typical of the human race. A curious circumstance is, that in a composite formed from the pictures of leading scientific men, an almost perfect likeness of Agassiz was secured, showing that this emminent naturalist was after the highest type

Dr. Albert Kellogg.—We regret that this venerable botanist, the only surviving charter member of the California Academy of Sciences, is lying very low at the home of his old friend, W. G. W. Harford, and is not expected to recover.

Free Passes —A naturalist writes us: "No more free transportations on R. R. after April 3rd, which means no more explorations by me; so there will be a clear field for energetic rich young men". Much of the best work in the fauna and flora of California, Arizona and Mexico, has been done by those content to do without remuneration. The courtesy extended them by the railroads, has enabled them to penetrate and explore regions otherwise inaccessible to them. The railroads will reap no advantage from putting a stop to this factor in the development of the country through which they run.

Dr. Albert Kellogg died March 31st, in Alameda, at the age of 74 years.

We acknowledge a call from Prof. Charles V. Riley, chief of the U. S. Entomological Commission, Washington, D. C., on the 2nd inst.

NOTES AND NEWS.

Hon John D. Cayton, some twenty years ago, began to domesticate the wild turkey in the neighborhood of Santa Barbara, under very favorable circumstances, having parks with palings eight feet in height. He took the eggs from wild turkeys' nests, the young birds becoming tame to a certain extent, though not entirely divested of their wild habits The succeeding generation became tame turkeys in form, and more or less so in habit, the habits clinging to them the longest. He has raised some every year, last year about one hundred.

Some doubt seems to exist as to whether the great snow peak, Mt. St.-Elias, is in the territory of Alaska or that it belongs in the British possessions.

It is upwards of 800 years ago, at least, since the mound builders occupied this country, according to some archæologists.

It is generally supposed that Cortez planted in Mexico, in 1530, the first wheat ever sown on American soil. Yet, the *American Miller* says: "In a mound opened in Utah, were found buried the remains of a man 6½ feet in length, the skeleton of a woman nearly as long, and moreover, handfuls of wheat preserved in a stone box." If this was true, wheat was known in America long before the coming of Europeans.

The volcano of Mauna Loa, H. I., broke out with a heavy eruption January 17th.

Dr. Asa Gray visits Europe again this month.

Dr. C. C. Parry expects to return to Iowa in May.

L. Belding has made a trip to Encenada de Todos Santos, Lower California, by steamer, in search of certain birds.

Prof. H. A. Ward, of Rochester, N. Y., recently paid San Diego a brief visit.

Nineteen more ostriches have emigrated to San Diego county from South Africa. The sheltered valleys of the county are considered more suited to these birds than the country further north.

The American Naturalist, for January, contains a description of a new species of Dipodomys, with some account of its habits by F. Stephens. This desert pocket-rat inhabits the Mohave and Colorado desert regions of Southeastern California, and receives the specific name of deserti. The February issue of the same magazine, contains a description of a new species of wood-rat from Cerros Island, off Lower California, by C. Hart Merriam, who names it Neotoma bryanti,—the specific name being in honor of Walter E. Bryant, of Oakland, Cal., who discovered it in 1885.

L. Belding says that the horned toad (Phrynosoma), is called by Lower Californians the *Chamelcon*.

LITERATURE.

We are indebted to Hon. E. M. Goodwin, John Spence, Dr. C. C. Parry, and others, for interesting papers.

Flora near Santa Barbara, Cal., by Mrs. R. F. Bingham, reprinted from the *Botanical Gazette*, has been received from the author.

The Santa Babara Society of Natural History have issued their first Bulletin.

Pittonia, a series of botanical papers by Edward L. Greene, Vol. I, part 1, has been received. It consists in part of re-prints from the WEST AMERICAN SCIENTIST, with descriptions of new (mainly Californian), plants, and the author's views on the systematic arrangement of others. Some West American species of Trifolium, Asperifoliæ, and Zauschneria receive principal notice. A new genus of Asteroid Compositæ is described and a review given of some recent botanical literature. 49 pp. 3¼ x 6½ inches Price 50 cents.

The ferns of Ceylon, and notes on Hawaiian ferns, by Lorenzo G. Yates, have been received from the author, who has in preparation a list of all ferns, with synonyms, habitat, etc. Any information in relation to new species, new localities, and other matter of importance, will be valued and properly credited. Dr. Yates' address is Santa Babara,

THE BOOKMART is a regular and welcome guest, from Pittsburg, Pa., always of interest to the lover of good literature and books. Monthly, $1.50 a year.

Pts. 1 and 2 of the 6th annual report of the State Mineralogist have been received from the California state mining bureau. Pt. 1, by Henry G. Hanks, contains a valuable map of San Diego county, map of the Julian mining district, and account of the mines of the county. A list of the mineral species at the present time known to exist in the state, is an important feature. The second part, by Wm. Irelan, Jr., is devoted mainly to the applied science and laws of mining.

KOSMOS is the name of a new eclectic monthly journal of science and art, published in San Francisco.

The International Co. of Mexico, has issued a neat pamphlet with a number of fine illustrations engraved from photographs.

THE GOLDEN ERA announced in its first San Diego issue that it was going to change its name.

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"The Tennessee flora, with special reference to the flora of Nashville", by Dr. August Galtinger, 1887, has been received from the author. The 109 8vo. pages give 1,708 species and varieties of plants for the state; 1,251 for the vicinity of Nashville.

A valuable account of the general aspect of the flora is given, while copious notes add to the interest of the catalogue.

Dr Asa Gray's "Botanical Contributions" for 1887 has arrived, giving revision of some polypetalous genera and orders, descriptions of Chihuahua and California plants and notes on others of great interest. These papers are almost indispensable to the botanist who wishes to keep posted in regard to the advancement of the science on our coast.

"West Coast Shells", by Prof. Josiah Keep, will soon go to press. The proofs of some of the engravings for this work show that it will be illustrated in a superior manner.

"Belostomidæ and other fish-destroying bugs", by Geo. Dimmock, from the annual report of the Fish and Game Commissioners of Mass., 1886, has been received from the author.

We would make acknowledgement for two pamphlets received from the author, Chas. Joly, "Une visite aux expositions de Londres et de Liverpool," and "Note sur L'ecole d'arboriculture et de viticulture de Geisenheim".

The *Semi-Tropical Planter*, H. C. Cook & Co., publishers, San Diego, is a new monthly journal devoted to agricultural and other kindred interest of this section.

The *Horticultural Art Journal* is one of our most valued exchanges, published monthly by Stecher Lithographic Co., Rochester, N. Y. Each number contains four or more magnificent colored plates of new fruits and flowers, making it practically indispensable to horticulturists who wish to keep up with the times. We wish all our friends might see the superb numbers before us.

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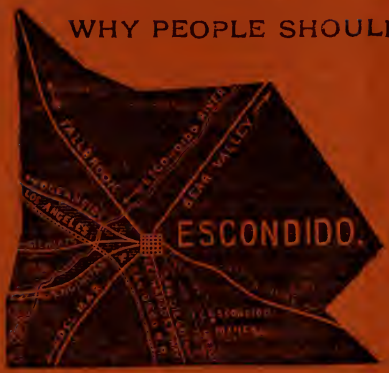

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Beware of Imitations.

The West American Scientist.

Vol. III. MAY, 1887. No. 25.

GYPSUM ON THE COAST OF LOWER CALIFORNIA.

There are many localities on the coast of Lower California where gypsum could be obtained. Canoas Point, however, is the principal place where this sulphate of lime is to be found in great quantities. In the vicinity of this place are numerous marly and argillaceous beds, of a grayish color and very soft, between which are intercalated numerous deposits of gypsum of different thickness and in laminated and fibrous masses, with a saline lustre. On a fine, sunny day the bluffs surrounding Cape Canoas glisten and sparkle with light which is reflected from the surfaces of many lamina of gypsum; even the rocks on the beach are covered with a thin deposit of this hydrous calcium sulphate. Farther beyond the bluffs, in the valleys, are also beds of decomposed outcrops of gypsum.

The formation of the sulphate of lime has, in all probability, originated in this way:

By the action of air and water, the gaseous masses of sulphurated hydrogen from volcanic vents were transformed into sulphuric acid, and this acid, acting in its turn upon the carbonate of lime of the formation produced hydrous calcium sulphate, or gypsum.

The country near Canoas Point belongs, in my opinion, to the Eocene period, though north and south of this cape the coast is in many places volcanic, and shows the signs of metamorphism. In botanical aspect the vicinity is very poor, maguey (Agave Shawii) even being absent. Here and there grow only some chollas, echinocacti and milky poisonous bushes of rhus laurina.

M. Lopateck i.

A curious sign may be seen in San Diego. On approaching it from one direction it reads: 'Jobbing;' when facing it directly in front it reads, 'Roofing;' after passing it by it is found to read, 'Tinning.' This is effected by means of coarse perpendicular ribs, which present different surfaces to the eye when seen from opposite directions, but showing both surfaces when viewed directly in front.

EMINENT NATURALISTS—VI.

LINNAEUS.

On May 24th, 1707, a little child was born in an obscure town in Sweden. His father was a Protestant minister, and as the years went by, he thought it best that this son should be educated for the same sacred office But little Carl's mind seemed to be more bent on studying flowers than conning books, so his teachers advised the good father to alter his plans for the boy's future, and apprentice him to a carpenter or a tailor.

True, he seemed unusally bright in the subjects which claimed his attention; he knew the names of the flowers which grew in his father's spacious garden, when but a lad, and books of science, particularly those about plants and animals, were his delight. Still, it did not seem best for him to continue the studies which would fit him for a place like his father's, and so that plan was abandoned.

Fortunately, his love for the objects of nature attracted the attention of a physician, and under the supervision of this friend, he was allowed to study both botany and the principles of medicine.

Conscious of the power which lay within himself, Linnè, or Linnaeus, as his name is commonly written, endeavored in 1728, to gain a place at the University of Upsal, where he might use the knowledge which he had obtained, and which he wished to make available for others also. But in this he failed, and no opening was ready for the young scholar.

Somewhat disheartened by this attempt, he turned his attention to medicine, hoping to perfect himself as a physician. But he did not give up his love for flowers, and occasionally he obtained a chance to lecture upon his favorite science.

The evident talent which he possessed attracted attention at length, and he was commissioned by the Royal Academy of Sciences to make a botanical tour through Lapland. He accepted the charge, and in 1731 he set off to that cold and uninviting country.

Departing from the ordinary line of travel, he crossed mountain ranges, explored the plains, and traveled up and down the country, often enduring great risks and hardships. But he returned at length, having successfully accomplished the work which he had undertaken, and as a result of which he afterwards published his *Flora Laponica.*

He was poorly paid for this enterprise, and soon went to Holland, where he finished his medical studies, and had the good fortune to fall in with a rich Amsterdam banker, who had a fine residence, an extensive library and a garden full of interesting plants. To this delightful spot was Linnaeus invited, and there he spent two happy years, studying and arranging specimens, and

writing upon his books, which were afterwards published in so many editions.

At length his work here was completed, and he went to Sweden, and established himself in Stockholm as a physician. Though so well known as a naturalist, he gained practice as a physician but slowly. In 1741, however, he was appointed medical professor at the University of Upsal, and by exchanging work with the Professor of Botany, he soon made that department the most famous in Europe. Students flocked from all over the continent, and even from America, to enjoy his instruction. Honors and riches now came to him in abundance, and his later years were spent in affluence.

Species Plantarum, was published in 1753, and was his most important contribution to scientific literature.

In it he established the dual system of nomenclature, by giving to each species a distinct name, descriptive of some peculiarity, and appending this name to that of the genus.

I heartily regret that it has since become common to derive the name, not from the species itself, but from its discoverer, or from some one whom the namer wishes to immortalize; and I trust the coming scholar will reverently bury such a name, for instance, as *Helix Dupetithouarsii*, Desh., or, at least, put it away in some snug spot in the museum, and give to our pretty Monterey snail a more appropriate designation. Doubtless, the old French admiral, Abel Aubert Du Petit—Thomas, was a great man, but his greatness was hardly enhanced by the act of Deshayes, who christened the little snail with so long and uncomfortable a title.

Let it pass into the list of synonyms, and let some simple adjective, descriptive of the species, take its place.

Linnaeus died Jan. 10th, 1778, sincerely mourned by the most distinguished men of his time.

His life teaches us that it is not always an easy thing, even for an enthusiast, to obtain a place where he can follow out his chosen work. But it is also an example of earnest and devout study, ultimately rewarded with honor, riches and undying fame.

Josiah Keep.

HERMIT CRABS

The *Popular Science News* says: 'The hermit crab possesses the wonderful instinct of finding the cast-off shell of some other animal, which he occupies. As their size increases, they move out of the old house, and start off in search of a better-fitting one. They sometimes find a desirable residence already occupied by another hermit crab, and then an amusing but desperate fight takes place, and if victorious, the house-hunter turns out the rightful occupant, and snugly ensconces himself in the shell, while the evicted tenant must move on until he finds another one.'

CONTENT.

No rivalry among the flowers;
They bloom as bright in nature's bowers,
As in conservatories grand,
Or at some gala public stand.

No coveting another's dress,
No envying its loveliness;
No mimicking each other's style,
Or heeding Fashion's foolish wile.

The daisy is a daisy true,
And covets not the richer hue
Of roses, pinks, chrysanthemums,
Verbenas, or geraniums.

The pansy and the marigold,
Though not together in one fold,
Look up and smile and give due praise
For sunny and for rainy days.—*S.*

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*HAWAIIAN FERNS.**

The Hawaiian or Sandwich Islands, the most important Polynesian group in the North Pacific, consist of eight inhabited and four uninhabited islands, lying between 18° 55′, and 22° 2′ north latitude, and 155° and 161° west longitude. They were discovered by Capt. Cook, in 1778, and were named Sandwich Islands, in honor of the Earl of Sandwich. The native name of the group is from the name of the largest island, Hawaii, (formerly written Owhyhee), 74 by 90 miles, with an area of 3,950 square miles.

The distance between the extreme points of the group is about 400 miles. The highest point is Mauna Kea, on Hawaii, 13.900 feet in altitude.

The islands are situated in the track of the trade wind belt, and from their isolated position, present interesting and favorable localities for the study and collection of ferns. In many places, the trees, shrubs, rocks and soil are so thickly covered by the different species of these delicate and beautiful plants, as to impede the progress of travellers.

Miss Bird writes: 'In some places the forest becomes an impenetrable mass from the abundance of Gleichenia'—a stiff-growing, wiry species, and that she collected seventeen species of ferns growing upon the prostrate trunk of a tree fern

In other places, the filmy, feathery fonds of ferns add an indescribable charm and beauty to forest and landscape. The climb-

ing ferns cover the otherwise naked trunks of palms and other trees, while many species grow imbedded in moss.

Of the 129 species known to grow upon these islands, 10 only are found in North America wild, five of which are native to California. Many of the others are restricted to certain islands, and on those islands to certain localities. It is said of the climate of this group that, although the temperature is remarkably equable, yet as many climates may be found as there are square leagues.

On the windward side of the mountains, rain often falls to exceed 200 inches in a year, while the leeward side is generally arid and comparatively barren. One peculiarity is, that among the great number of ferns, only one species of the Maiden Hair is found—Adiantum Capillus-veneris.

* Notes on Hawaiian ferns, compiled from the works of Hooker, Baker, Bailey, and others, by L. G. Yates, Santa Barbara, Cal., 1887. 15 pp., 5¾x3¼ inches. Price 50 cents.

THE FERNS OF CEYLON. *

The island of Ceylon is situated between 5 deg., 51 min. and 9 deg., 51 min. north latitude, and between 79 deg., 41 min., 40 sec. and 81 deg., 54 min., 50 sec. east longitude, and has an area of about 25,000 square miles.

The southern portion of the island consists of an interior mountainous region surrounded by a low coast line of from 30 to 80 miles in width. The mountain zone covers an area of about 4,000 miles. The highest mountain is 8,295 feet in altitude. The rivers in this region are bordered by a dense growth of forest and diversified with innumerable cascades and rapids, flowing through deep chasms, whose rocky walls furnish admirable conditions for fern growth, where they grow on the rocks and trees, especially in the central and southern provinces. The northern portion of the island forms a vast unbroken plain.

The summits of the highest ridges are covered with verdure, and the slopes were formerly covered with forests of lofty trees which have disappeared under the axe of the coffee planter.

The climate of the island is regulated by the monsoons. The southwest monsoon prevails along the southwest coast in early summer; the northeast monsoon reaches the northeast coast about October or November. The former drives the clouds against the lofty mountains of the south and west, supplying copious rains which do not reach the eastern and northern portions of the island. The effect of the northeast monsoon are more uniform, and the showers extend over the entire surface of the island. At Ratnapura, lying immediately under Adam's Peak, the annual rainfall is about 146 inches, and the number of rainy days, 228; while at Badulla, at an altitude of 2,220 feet, the amount of rain is about 58 inches, with 57 rainy days. This wide difference of climatic conditions gives suitable conditions for

species having widely different requirements for their growth, and presents a goodly list of species as indigenous to the island.

The majority of the ferns grow at an elevation of between 2,000 and 5,000 feet.

The balance of this little pamphlet is occupied with a list of the ferns and extracts from the manuscript notes of the late Dr. Thwaites and the published works of Hooker, Baker and Wall.

* The ferns of Ceylon, by Lorenzo G. Yates, 33 pp. 5¾x3¼. Santa Barbara, 1887. Price 75 cents.

SANTA BARBARA SOCIETY OF NATURAL HISTORY.

The Santa Barbara society of natural history, was organized December, 1876, with twenty-one members.

The object of the society as set forth in the constitution, is, 'the increase and diffusion of a knowledge of the natural sciences; by the establishment of a museum, the reading and publication of original papers, and other suitable plans.'

The meetings of the society were for two years, held in the Santa Barbara College building An offer of a place in the I. O. O. F. Library, was made by the Trustees of said Library, and was accepted.

At the time of the change, the museum specimens occupied one case, and there were a few books and pamphlets.

These gradually increased by individual donations.

In 1883, the society was made a repository for government publications in place of the Santa Barbara College which had been closed: and the library of the College, consisting of twelve hundred volumes, was transferred to the society.

The museum specimens at this time, occupied four cases, and these, together with the library, were moved to rented rooms; and the citizens of Santa Barbara, contributed funds to purchase bookcases, and furniture.

In 1884, the owners of the Library Building offered the free use of rooms adjoining the Public Library, and the society is there located, in convenient quarters.

The library now contains over 2,700 volumes.

After moving to the Library Building, the society purchased a collection of Archeological specimens, valued at three hundred dollars, the money for which was raised from the proceeds of an entertainment.

These specimens, together with others that had been previously donated, make a very fair collection for that department.

Of botanical specimens, there are about two thousand mounted phanerogams and ferns from various sources; three Fasiculæ of Algæ prepared by Profs. Farlow, Eaton and Anderson; besides a good representation from our own coast.

The mollusca are represented by about eight hundred and fifty (850) species, comprising land, fluviatile, and marine shells.

There are over five hundred specimens of minerals and fossils, eighty-one mounted birds of this region, besides a large miscellaneous collection.

The present membership is forty-five. Of these but few are active members, not over half a dozen pursuing any special branch of study; consequently, the original papers that have been written are not numerous.

This region presents a wide and comparatively undeveloped field for research, but the laborers are few.

Although some good work has been done in various departments of natural history, work that has been rewarded by new discoveries, much more might be done, if there were workers in the field who had the time and inclination to accomplish it It is to be hoped that the next decade will be more fruitful in results.

Mrs. R. F. Bingham,

Santa Barbara, Cal., February, 1887.

AQUATIC PLANTS OF THE VICINITY OF SAN DIEGO.

The flora of the Pacific Coast is largely composed of plants belonging to families and genera that are mainly confined to it, and to the adjacent Mexican region. In the higher mountains and along our water-courses, may be found a goodly number of species that represent eastern and New England plants—in many cases identical with them, which would lead us to suppose that whatever aquatic plants we found, would even more nearly approach in genera and species, those of the eastern states.

While terrestrial plants are naturally much more limited in the range of their distribution than aquatic species, they more truthfully show the characteristics of the flora of a region; but, on the other hand, the distribution of the water plants may be studied for the purpose of more easily learning the relations between the floras of different regions, as more nearly showing their common origin.

This view may not be wholly correct, or sure of leading the investigator to results at all reliable. I have before called attention to the peculiar terrestrial molluscous fauna of California, which may be divided into two classes: those peculiarly Californian forming the one, while those of the eastern or circumboreal distribution forming the other, the latter corresponding to the representation of eastern species, in our flora, along our water courses and in the mountains. All, or nearly all, of our fresh water mollusks, we find to be of very wide distribution in the United States, several of the few species extending over nearly the whole of North America.

These facts show that we have three distinctive elements in our flora to be considered: that composed of species most limited in range, and therefore most characteristic; that which represents to some extent the plants of the north and east; and third. the purely aquatic element, which we would, naturally, expect to resemble the last, but which more nearly approaches the first, at San Diego.

During the wet spring of 1884, I had an excellent opportunity to collect and note the aquatics of this vicinity. The preceding year was unusually dry; few, if any, aquatic plants being able to appear, from lack of their required element; and many of our wild flowers were dwarfed or stunted or wholly discouraged from making an appearance, or even an effort to grow.

No water plants had been reported from San Diego, except the wide-spread Azolla Carolinianus—common to both Americas—and a few other well-known species.

But the heavy rains of the winter of 1883–4, especially during the spring and late into the summer, flooded the entire country; the rivers, usually 'bottom side up' filled their banks; every creek overflowed; every depression or little hollow was changed into a miniature lake or a wide-spreading lagoon; and springs of water gushed forth in unheard of places.

Especially on our mesas were to be found thousands of miniature lagoons of large or small dimensions. The surface geology of large portions of these mesas is characterized by innumerable hillocks, or small, mound-like formations, rising from one to four feet above the intervening depressions, and ranging from ten to fifty feet in diameter. They are generally nearly circular, though often irregular; and the depressions contain in stony places, accumulations of cobblestones. These innumerable hollows were quickly filled by the persistent rains; soon the tiny leaves of Calitriche marginata floated upon their surface, the long delicate stems of the plant extending downward to the bottom, where they were firmly anchored in the soil by a multitude of rootlets; the deeper portions of the little lakes were carpeted on the bottom with fields of the growing green of Pilularia Americana, a new species of Isoetes, and other minute plants; while along the borders of the pools, large patches of Tillæa angustifolia and Elatine sprung up and formed a tangled mat of luxuriant vegetation.

Thus, the lakes were formed, their surface and bottoms grown over with plants till the water was hid from view, and gradually disappeared by evaporation, leaving only dense jungles on a minute scale. The Callitriche and Elatine blossomed and bore fruit; Pilularia and Isoetes ripened their spores, then

'Withered away to let others succeed'

when another favorable season should chance to roll around in future years.

Some of the larger depressions, longer covered with water, were filled along the edges with junci, sedges and grasses, exceeding

in comparison the tules and reeds and rank vegetation along the borders of the largest lakes.

Later in the season, Downingia pulchella and Pogogyne undiuscula, with several less conspicuous plants, took the place of the minute vegetation, and carpeted the pools and ponds; still later, golden bloomerias and blue brodiæas, and other beautiful liliaceæ were found; these, in turn, gave way to a few compositæ, which finally surrendered the field without a murmur to the lichens on the cobblestones, that were to reign in silence, and alone, in this kingdom of nature during the dry season that followed.

Marsilia vestita, common to lagoons at high altltudes, Ammannia latifolia, Echinodoris rostratus, and other water plants made an appearance during the season of 1884, on the borders of a larger lagoon, near the level of the sea, which is usually a dry flat. Numerous species of Potomageton were discovered in various portions of the county in running streams, and various other genera were found to be represented in the neighborhood of San Diego, by plants new to our flora.

On high mesa lands among the hills between the old missions of Santo Tomas and San Vicente, in Lower California, I found in 1886, the same species of Pilularia, Elatine, Isoetes, Tillæa, and Callitrichæ that I had previously collected on the mesas, back of San Diego city. A portion of these plants I had also observed in similar miniature lagoons in the Tijuana, and in the Guadaloupe valleys. The Pilularia was first described from South America, and has been collected as far north as Santa Barbara.

The fresh-water lagoons back of San Quentin bay, on the northwest coast of Lower California, presented a variety of plants along their borders. None of the previously mentioned species were found, but rather, non-aquatic plants seemed to predominate. The most interesting discovery was the new grass named by Dr. Vasey, Orcuttia Californica,—as the type of a new genus. A Pogogyne was found other than our San Diego species, but an umbelliferæ grew in abundance together with a common Mimulus that is frequently found near water.

It will be seen that the aquatic plants found in the vicinity of San Diego, grow under very peculiar conditions. Instead of running streams and permanent ponds and lakes, in which to carry on the warfare for the 'survival of the fittest,' they have to accommodate themselves to very minute bodies of water, that have only a precarious and uncertain existence during the more favorable seasons; they must be contented to appear only once or twice in several years, and when tempted by the genial rain to make their debut, must be prepared for either an aquatic, sub-aquatic, submerged, or a terrestrial life.

Similar conditions, I believe, are found on the west coast of both North and South America, but with the data at my command I

will not attempt a discussion of the relations and bearings of these facts, on the origin and distribution of our flora.

I would add, that I place no particular importance on the presence of the Potomagetous (among them P. natans, L.) in our running streams, and in the lagoons in the high mountains, or on the occurrence of other widely distributed aquatic plants, like the Azolla. The presence of these species only show us that it is true that aquatic species are of wider distribution, and less characteristic of a flora under ordinary conditions, than are the non-aquatic plants. *C. R. Orcutt.*

ITEMS RELATING TO INSECTS.

What is said to be a fact not generally known is that bees collect from only one description of tree or plant at a time.

It has been demonstrated by Mr. J. W. Slater that caterpillars are affected by magnetic currents, which hinder their development and even kill them.

A spiny African caterpillar, seven inches long and of a steel grey color, was exhibited at a recent meeting of the Linnæn Society of London.

Recent comparison shows that the silk of Bengal is equal to that of Italy, but the curious difference appears that the Italian worm spins a thread nearly five times as long as that of the worm of India.

In a paper to the London Entomological Society, Mr. J. W. Slater showed that all brightly colored insects do not live on flowers, as Mr. Grant Allen has asserted, but that many species are carnivorous.

Maj. Gen. F. F. Burton has described certain large, yellow hornets of India, which dispose themselves in regular circles upon their nest, with their heads to the center. Thus they appear like the spokes of a yellow wheel, and a nest of them is sometimes mistaken for a sunflower.

In an extensive series of experiments by Prof Graber, insects and many other in vertebrates perceived odors much more quickly and acutely than the vertebrates tested (birds and reptiles). The attennæ proved to be not the only organs of smell in insects, although these appear to be essential to the perception of some fine odors. In some cases the palpi of the mouth organs are more sensitive than the attennæ, but the perception of smell through the stigmata or respiratory organs is not rapid or important.

The records of locust plagues in the warm countries of the East, in modern as well as in ancient times, almost surpass belief. Kirby and Spence mention an army of locusts which ravaged the Mahratta country, extending in a column 500 miles long, and so com-

pact that it obscured the sun like an eclipse. Near the close of the last century, so many perished in the sea on a part of the African coast that a bank three or four feet high, and about fifty miles long, was formed on the shore by their dead bodies. The stench was carried 150 miles by the wind. In another part of Africa, early in the Christian era, one plague of locusts is said to have caused the death of 800,000 persons, and, in 591, nearly as bad a plague occurred in Italy. Again, in 1478, more than 30,000 persons perished in the Venetian territories from famine caused by locusts.

NOTES ABOUT FISH.

The new method of curing herrings by the application of boric acid has proved extremely successful in Norway, and called into life quite a new industry at Bergen.

A Norwegian writer affirms that he has observed whole shoals of fish, in their anxiety to escape pursuing whales, piled up above the surface of the sea to a height of from three to six feet, and on one occasion about fifteen feet.

Beaked Chaetodon of the Indian and Polynesian seas is a fish of eccentric form and beautiful tints, but its most remarkable feature is its curiously elongated muzzle or beak, which is employed as a gun, with a drop of water as a bullet. Unlike other fishes, this creature does not wait for its prey to fall into the water, but shoots it down like a true sportsman. Seeing a fly or other insect on a twig over the water, the Chaetodon quietly approaches, and, with its nose just above the surface, accurately projects a drop of water at the unsuspecting insect, which is thus knocked from its perch and is quickly snapped up by the fish. The finny archer is highly prized as a household pet by the Japanese, who keep it in bowls, and amuse themselves by watching it "shoot" flies held up before it.

Some interesting researches on the injury to the fisheries and fish culture by sewerage and factory waste waters have been made in Germany by Weigett, Sacre and Schwabe. Among other results it was found that the chloride of lime in the water, in proportions from 0.04 to 0.005 per cent., exerted an immediately fatal action on tench, while trout and salmon perished in the presence of 0.0008 per cent. of chlorine. One per cent. of hydrochloric acid killed tench and trout. Iron acted as a specific poison on fishes, as did alum also. Solutions of caustic lime had a very violent effect. Sodium sulphide, in the proportion of 0.1 per cent., was endured by tench for half an hour. The injurious action of putrid sewerage depends on the poisonous gases and the deficiency of oxygen.

CUTTING DIAMONDS.

When cutting a diamond, the stone is fastened in a ball of cement on the end of a stick and rubbed with another diamond set in the same way. The workman rests the stick on the edge of a little box, and the dust which is rubbed off is saved for polishing purposes. When the desired shape is obtained, the stone is given to the polisher, who fastens it with soft solder into a copper cup at the end of a stout wire, and holds it against a small steel wheel, wet with oil mixed with diamond dust, made to turn with great rapidity. By this means the facets are polished one by one, the stone being set in new solder for grinding each facet.—*Selected.*

NECROLOGY.

C. E. Broome, an English mycologist, died at Bath, England, November 15, 1886.

William Willoughby Cole, the Earl of Enniskillen, died November 12, 1886. He was the possessor of one of the largest colletions of fossil fishes in existence.

Dr. Martin Websky, of Berlin, died November 27, 1886, aged 62 years.

Thomas Moore, of London, well known among botanists, died on the first day of this year.

It was reported at a recent meeting of the Santa Barbara society of Natural History, that Mr. John Spence had succeeded in raising plants of the new California poppy, (Papaver Californicum, Gray,) which he lately discovered in the mountains.

The West American Scientist succeeds to the business of the *Naturalists' Companion.*

A five years' subscription with $5 cash has just been received. About time for us to double the size of the Scientist again.

The next International Scientists' Directory will be issued soon. We advise our readers to have their addresses inserted (for which no charge is made), and those wishing correspondents or desiring to make exchanges of books or specimens will do well to subscribe for a copy.

LOWER CALIFORNIAN NOTES.

[The following from the *San Diegan* of May 14, will interest our readers. The author, of the *U. S S. Ranger*, will contribute further to the SCIENTIST. ED.]

South of Rosalia Bay the shore is low and sweeps gracefully around towards the south and southwest. The flora is abundant; the valleys are covered with splendid white flowers of damiana and with red scarlet blossoms of palo-adan The last named plant. sometimes called Hocotillo, reta ns, however, but the flowers; its leaves are in this season already yellow and dry. It grows occasionally very near to the beach, contrary to the fouquiera gigantea, which grows further in the interior. This most remarkable tree, called by the Mexicans, cirio, is to be met with in great abundance in the vicinity of San Andreas, east of Rosalia Bay. All hills and mesas are covered with it and it attains a height of 40. 50 and even 60 feet. It forms a very singular view in the desert, sometimes growing straight like an arrow, sometimes inclined in all possible positions or bent in most fantastic forms. The wild date or datililo grows also in immense quantity and it is used for the preparation of fibre and paper. San Andreas Valley and the surrounding country belongs to an English company, Henry Louis & Co., which proposes to start the manufacturing of datililo paper.

The valley itself is very beautiful. It is sheltered by high hills, which further grow higher and higher and finally end in mighty peaks of Sierra Yubal and Sierra Massal. Beyond the first ridge of hills one can see three prominent peaks, Guia Izquierda, Guia Derecha and Punta Prieta, and behind them the cloud-like outline of the titanic Cerro Colorado is dimly visible.

The flora in the valleys and the neighboring canons is very rich. Damiana does not grow here; it prefers more sandy ground a little further south, but we have here many other fragrant herbs. Between the rocks and on the high ground grows yerba del venado, used as tea, and on the level plain, together with mesquite wood, I remark the green bushes of jojova, covered with acorn-like fruit. The fruit has a nice flavor and it is used with cacao. The prickley bushes of rutilla are covered with red berries and the yellow gubernadora is losing also its flowers. Similar to torote is copalquin, quite a considerable tree with whitish bark and soft red wood, greatly used in the tanneries. Dark green copal and timbe and haria grow also in abundance, and between them is easily perceived the splendid red flower of yerba del tabardillo or burning fever plant. The giant columnar cactus is here 50 feet high and the pitalla dulce, tall and similar to carambuyo, appears here for the first time. Century plants, echinocacti and pitalla agria are also abundant, and between chollas I remark two species with magnificent flowers; small and prickly tasahio with yellow flowers, and the taller but not less prickly civire with red blossoms. The common milky liga is, of

course, everywhere and also other species of liga with white flowers. A very remarkable plant is candeia with scarlet flowers; its stem, about two feet high, branches near the base into several other stems running parallel to each other; it is more milky than even liga and emits a strong, fetid odor. A few buckeyes I have seen north of San Andreas, though they are not so numerous as near Blanco Bay.

In the last named bay an officer of our vessel made a startling discovery. He went on shore and on his return asked me if I remarked there, not far from the beach, a cubical rock, about seven feet high, covered with some kind of hieroglyphic inscriptions. Stating that I did not see it, he handed me a copy of the hieroglyphics and requested me to decipher them, if possible. As we left Blanco Bay early that day, so I had no opportunity to go ashore and investigate the rock. I tried, however, my best to decipher the copy, in which I partly succeeded, though I would not vouch for the correctness of the translation. The words are as follows:

"Rising sun drives perpetually Iztac Mixcoatl, the spirit of the tornado, which (that is Iztac) strikes with flint and devours four moons; Mixcoatl's one eye visible in clouds (that I, Mixcoatl, slowly perishes)."

There are a few things in this inscription which will strike the reader of this as they strike me. First of all, how is it that the name of Iztac-Mixcoatl came to be mentioned on the rock of Lower California? We know that Iztac in the Toltec mythology is the white-cloud serpent, the spirit of the tornado. He created the world and he was overcome by Tezcatlipoca, the spirit of the night. Some of his symbols were the cross and the flint, and both of these symbols are engraved on the rock in Blanco Bay.

Now, about the four moons. There is a tradition in Mexico that Mixcoatl in his struggle with the sun had devoured four moons, but finally perished in clouds. Now, on the rock I mentioned we have the same story repeated again. It is, in reality, a very curious coincidence.

But all this, coincidence or no coincidence, will not explain to us what the Toltecs had to do with Lower California. It will, perhaps, not be explained, but it will give us something to think of. We know that in time immemorial the Indian tribes began to invade the valley of Anahuac, coming from some unknown northern(?) country. The Toltecs, Chichimecs and Aztecs and many others were pouring into Mexico from time to time and conquering each other. The Toltecs as they mysteriously came, so mysteriously they perished, leaving behind them the magnificent but broken fragments of their ancient civilization; they probably dispersed in Central America, but where were their original dwelling places is unknown. Perhaps, after all, Lower California was the cradle, the origin of their nation. MAURICE LOPATECKI.

CORRESPONDENCE.

AN APPRECIATED HONOR.

Mr. C. R. ORCUTT (San Diego, Cal.,)—Dear Sir: I am instructed by the San Jacinto Chapter of the Agassiz Association, to notify you that you was elected an honorary member of the association, at the last meeting.

We ask you to take a kindly interest in the organization, and give it the weight of your good wishes. Very respectfully,

San Jacinto, Cal., April 6, 1887. *Clara Long, Secretary.*

DISCONTINUED.

Please discontinue the advertisement of the *Naturalist's Companion*, now running in the WEST AMERICAN SCIENTIST. I have discontinued the publication of the *Companion* and am going out of business in Brockport, as I am about to enter Eastman's Business University. Shall transfer my subscription list to some worthy publication shortly. Please make mention of this in your magazine, and oblige, *C. P. Gueif.*

Brockport, N. Y., March 23, 1887.

AN EXCELLENT MAGAZINE.

Will you please send a sample copy of your magazine. I am taking the *Naturalist's Companion* of Brockport, N. Y.; it is an excellent magazine. I would like to take a half dozen as good naturalist's magazines, if I could find them.

Charlestown, Ill. *J. P. Dunlap.*

A REMINISCENCE OF THE PAST.

I duly received the Nos. of THE WEST AMERICAN SCIENTIST. I soon got deeply interested in their contents, particularly the botanical portion, which is my specialty. It seems like a fairy tale to know of the surprising developement of Southern California within the past ten years. When I was at San Diego, in 1873, it was a very crude sort of a town, and the most sanguine believer in its future, would have hardly dreamed of a scientific journal ever being published there, but so it seems to have come about, and certainly you have started a journal worthy of an older civilization. I hope it will have a long life, and ever-increasing prosperity. I truly long to renew my botanical acquaintance with California, where in the winter of 1873, I collected nearly 300 specimens of flowering plants, besides ferns, mosses and seaweeds, mostly about Santa Barbara and Los Angeles, with some in Sonoma and Lake counties, Northern California.

There is little to suggest botanizing as yet in this frozen region, as yesterday we had a driving snowstorm, and to-day the country looks like mid winter.

I would like, if possible, to get the Nos. 1 and 2, of Vol. I, of THE SCIENTIST, so as to complete the set. I suppose they are

out of print? I would willingly give 25 cents apiece for them, if to be had.

With much appreciation for THE SCIENTIST, I am truly yours,

W. L. Foster.

Hanover (Mass.), April 19, 1887.

THE BEST.

Your paper (THE WEST AMERICAN SCIENTIST) comes regularly, and is *decidedly* the best of its class.

Geo. W. Tryon, Jr.

Philadelphia Academy of Sciences.

ANOTHER SOCIETY.

The Humboldt Natural History and Archæological Society was organized and incorporated here last evening (April 16) with the following board of directors and officers—all of Eureka, California: J. B. Brown, President; J. F. Cornan, Secretary; Prof. H. E. Whipple, R. B. Powell, Robt. Gunther. Additionanl members eight.

The society begins under favorable auspices. The next meeting is to be on May 5.

I hope to be able to send you some notes during the summer from an unfrequented part of the Coast Range, in the southeastern part of the county.

Carl C. Marshall.

Eureka (Cal.), April 17.

EDITORIAL.

PROGRESS.—In our correspondence this month, we find a letter reminding us of the early days of San Diego. When venturing to issue our first four-page number, San Diego could claim near 5000 inhabitants; to-day a census reveals some 12,000, while the sound of hammers can be heard on every hand far into the growing suburbs. This is the result of a year's steady progress, which continues unabated. Visionary projects are being realized. What San Diego *may* be a few years hence, is hard to realize or to comprehend. While our correspondent is enjoying a mid winter scene, we are admiring the full rich blossoms of Lathyrus splendens, our grand wild pea, the cactuses are blooming in our yard, wild flowers are ornamenting our green hills, and the agave is sending up its tall spike of flowers almost visibly increasing in size under our gaze.

PROCEEDINGS OF SOCIETIES.—Reports of societies for the past month have not been received in season for this issue. An Agassiz Association is talked of in Los Angeles, and we hope they will succeed in organizing. The Humboldt society has been revived, as will be seen by Prof. Marshall's letter.

LITERATURE.

NEARLY A TON of new books and publications are said to be daily received at the British Museum in London.

PROCEEDINGS OF THE CANADIAN INSTITUTE, March, 1887, has been received from the secretary.

VALUABLE PUBLICATIONS have been received from Wm. H. Dall; Santa Barbara Society of Natural History; Royal Sociétie Malacologie de Belgique; Boston Society of Natural History; Trenton (N. J.) Natural History Society; Elisha Mitchell Scientific Society; Charles R. Barnes, Rev. John Dickinson, S. E. Cassino, and others.

THE SWISS CROSS improves with age, and is well filling the position it came to occupy.

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NOTES AND NEWS.

Dr. C. C. Parry has concluded to lecture before the Chautauqua circle of Monterey, and will not return to his home in Davenport, Iowa, at present.

L. Belding is visiting in Pennsylvania.

Rev. and Mrs. David Cronyn have returned to their former home in Massachusetts, where they propose to reside for a year.

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VOL. III. MAY, 1887. No. 25.

THE OAKS OF SOUTHERN AND LOWER CALIFORNIA.

The oak, the chestnut and the beech belong to a family which furnishes some of the most insignificant and worthless shrubs, and some of the grandest and most useful of trees. The family is easily distinguished by nut acorns in cups and simple, alternate leaves.

This genus contains some 250 species distributed throughout the temperate and warm regions of the northern hemisphere, and are especially abundant in Eastern Asia and in Mexico. The wood of the genus is mostly hard and durable, rendering it valuable for economic uses, while the bark, from the amount of tannin it contains, is extensively used in the manufacture of leather. Quercus agrifolia, the maritime live oak of California, furnishes the tanners at San Diego with their main supply of bark for tannin purposes. The bark of another oak, Q. suber, of Southern Europe and North Africa, supplies the world with the cork of commerce. The cork oak flourishes finely in California, and has proved of rapid growth at Fresno, Santa Barbara and elsewhere.

Of the forty kinds of oak found wild within the limits of the United States, fifteen are residents of California, eight or nine of these growing in the region included in the title of this sketch, and all but one or two of them are peculiar to the West Coast.

The true forests of San Diego County, and of the northern part of the Californian Peninsula, are confined to the mountains of an altitude of four to ten thousand feet. Three distinct areas in this county are covered with forests of oak and pine, centering around the peaks of San Jacinto, Palomar and Cuyamaca, while in Lower California are found the famous forests of the graceful pinyone pine and the grand old pineries around Hanson's ranch and on grim old San Pedro Mountain. These mountain glades and forests are delightful places for camping in the clear, bracing air that comes sweet from pines and cedars, and laden with a grateful fragrance.

I wish to emphasize here that these forests should remain intact. The value of the timber on these water sheds is insignificant compared to the benefit which results to the surrounding country from their presence, and it would be a near-sighted and extremely fatal policy that should seek to utilize them otherwise. The timber is inferior in quality to that found further north. Stringent measures should be taken to prevent injury to these water sheds either from the woodman's ax or from destructive mountain fires.

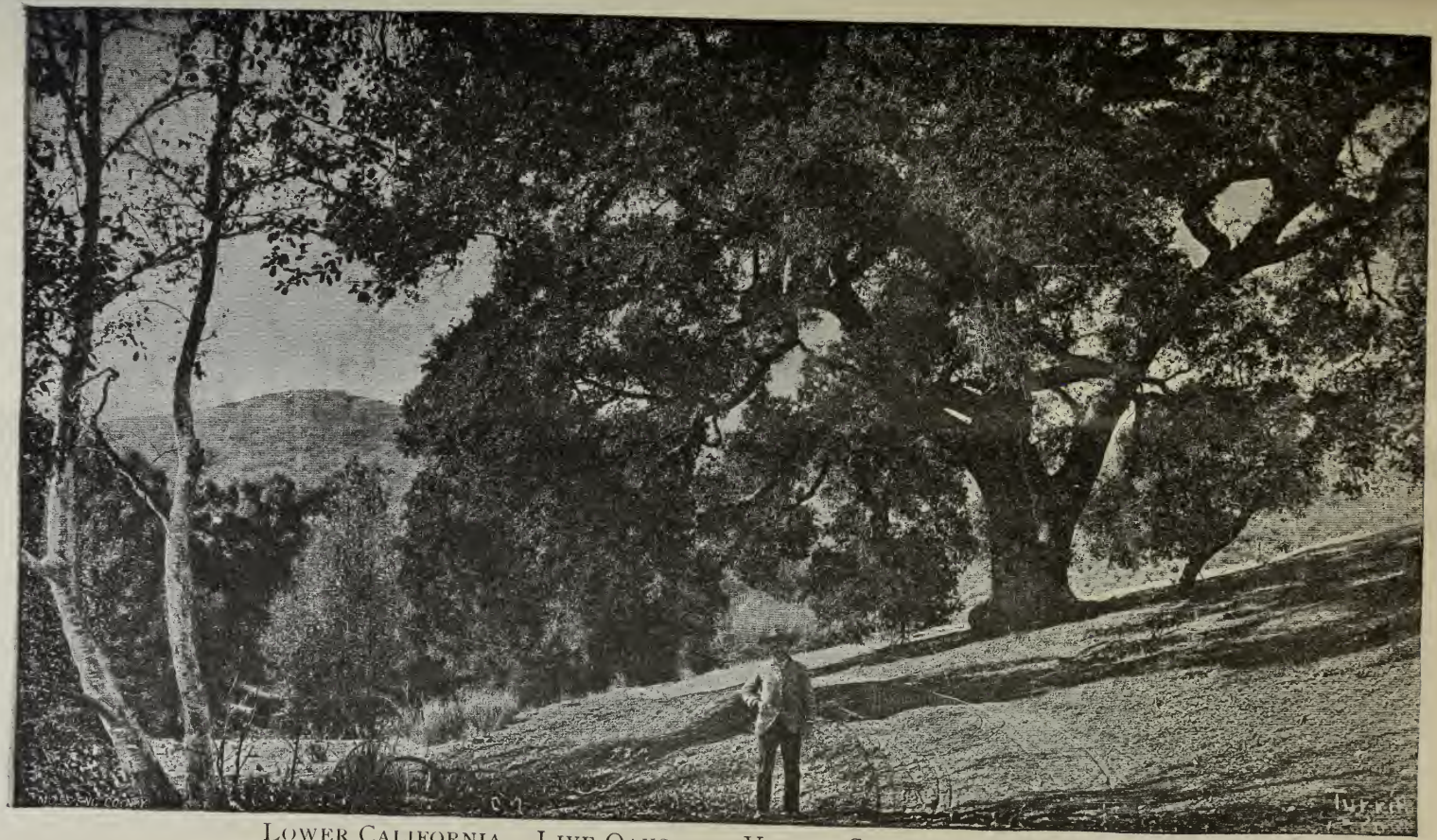
Quercus lobata, Nee, is a large and stately tree, with glabrous slender, often pendulent branches, that may be looked for in the higher mountains but I have not met with it in the wild state. Young trees are in cultivation near San Diego.

Q. chrysolepis, Liebm, the largest evergreen oak of California, is found abundant on the San Jacinto, Palomar and Cuyamaca Mountains, and a few straggly, stunted trees were found near Hanson's ranch, Lower California, at an elevation of about six thousand feet. This golden-leafed live oak at its best grows to a height of 100 feet with a spread of 150 feet and a diameter of eight to ten feet. At high altitudes or in unfavorable locations it merely forms a low shrub. The acorns mature the second season after flowering and are remarkable for their large size.

Q. Kelloggii, Newberry, fitly commemorates the services of the gentle botanist who so recently passed away. It is a middle-sized tree, sometimes a shrub, with rough black bark, common throughout the State. It is found in this county with the preceding species, but I have not yet observed it in Lower California. Leaves thick, broadly oval, pinnatifid-lobed, three to four and one-half or more rarely six inches long, deciduous.

Q. oblongifolia, Torrey, the mountain live oak, or evergreen white oak, occupies some of the higher valleys at the foot of the mountains, forming pretty groves on their borders and lining some of the canyons. It is a middle-sized tree with pale, smoothish bark, attaining a height of twenty or thirty feet. The oblong leaves are one or two inches long and half as wide, on very short petioles, entire or with a few blunt teeth, obtuse at each end or subcordate at base, at first soft, downy, the older ones entirely glabrous, coriaceous and almost without reticulation. I have not noted the species south of the United States line. It is also known as the post oak.

I now come to the lower mountain district, bordering the Colorado Desert, so-called, that forms the eastern part of San Diego County and of the northern half of the peninsula. This region possesses a distinct flora, as far as the general character of vegetation is concerned, from that found west of the mountains, and presents three species of oaks not found elsewhere in California. Two of these three species are common to Arizona and



LOWER CALIFORNIA. LIVE OAKS, AND VALLEY SLOPE, ON THE PENINSULA.
(PHOTOGRAPH.)

New Mexico, and, with the white oak, are the only Californian oaks not exclusively confined to the west coast.

Q. Emoryi, Torrey, is found in no great numbers on the table lands of the peninsula and may possibly stray north into San Diego County. This small tree grows some twenty feet in height and forms a handsome, compact tree in favored situations. The small, acute, usually entire leaves somewhat resemble those of Q. chrysolepis. Emory's oak was supposed to be restricted to Arizona and New Mexico, until I sent specimens to the late Dr. Engelmann from this region. Frequently only a scraggly shrub.

Q. pungens, Liebm, Dr. Engelmann treated in the Botany of California as a variety of Q. undulata, Torrey, of the Rocky Mountains. Dr. Engelmann, shortly before his death, wrote me that he considered it as a good species, and therefore I take the liberty of restoring it to specific rank. It is common in Arizona and New Mexico, while Dr. Parry found it in the California Desert, and I have found it quite abundant in the low mountains eastward of San Diego, near the southern border of the county, and southward over the vast table lands of the peninsula among the pinyones and other pines and with the preceding and following species. It is frequently not over a foot or two high, but sometimes reaches a height of ten or more feet. The small dentate, sharply pointed leaves are persistent through the winter, rendering it an evergreen, and the acorns are sweet and edible. I remember the low bushes thickly covered with the small acorns set among the leaves in October, 1882, and the exceedingly numerous excresences formed by gall flies that were attached to nearly every leaf. These 'oak apples' were from one quarter to one inch in diameter, as round as marbles and as beautifully marked with delicate lines and coarser markings of light red or pink on a pale ground color as any artist could desire. The effect of such gaily decked bushes on every hand during the long drives will not soon be forgotten.

Q. Dunnii, Kellogg (Q. Palmeri, of Engelmann), extends from the low mountains of San Diego County, near the southern border, over the table lands of the peninsula, and is not yet known from any other region. It is a tall shrub or small tree, eight to fifteen feet in height, with small, coriaceous and very rigid leaves, on petioles a line or two long, round, oval, obtuse or subcordate at base, with undulate or strongly-dentate margins. The subsessile acorns borne in turbinate cups, the nut densely tomentose within. This is very appropriately called the holly-leaved live oak.

Q. dumosa, Nuttall, is the common shrub oak extending from Lake County on the north to San Quentin Bay on the south, and from the coast throughout the hills into the higher mountains. It is usually a low shrub near the coast, with sharp dentately-toothed leaves that render the clumps almost impenetrable. At a

higher elevation it becomes a taller shrub or a small tree, sometimes with entire leaves. The acorns are very variable also in size and shape. A peculiar excresence is formed by some insect on the leaves of this oak, the galls being armed with deep, bright red spin s and collected in small bunches that are quite noticeable on account of their beauty.

Q. agrifolia, Nee, the California field live oak, is a most grand and picturesque tree with a stout low trunk and wide spreading branches clothed in dark green leaves that persist in rendering the tree an evergreen. The acorn is long, slender and tapering, borne in a turbinate cup, an inch to an inch and one-half long, maturing the first year This magnificent oak is found from north of San Francisco to south of Todos Santos Bay, on the west coast of Lower California, extending back from the coast over the foot hills, bordering the canyons and forming beautiful groves in the valleys. Through the mountains of this county, southward in the peninsula, they form a prominent and characteristic feature, but are absent from the higher mountains. The southern limit seemed to me near La Grulla, where I left the last low individuals of the species on my trip in 1886 to the region near the old mission of San Fernando. They may be found, perhaps, in the mountains back of San Quentin Bay. Mr. Belding mentions an oak resembling this in the southern extremity of the peninsula, but Mr. Gabb does not mention it as occuring south of where I observed the tree. The accompanying illustration represents a characteristic individual of this beautiful tree, said to equal and even surpass in size the famous oak of Louisiana, with which it still further vies in the graceful folds and hanging draperies that de k its far reaching branches, furnished by the delicate meshes of the lace lichen, Ramalina reticulata. This view will still further interest some of the readers of this magazine to know that the scene it depicts is that where Dr. C. C. Parry, C. G. Pringle, the author and others have collected some of the identical plants which now repose in their herbaria, this very tree furnishing us with shade at noonday, the little meadow below, rich pasturage for our horses, and the little stream beneath the sycamores on the left supplying water for lemonade and coffee. Near by our tent has been erected, our blankets spread. and botanist's hearts satisfied with rich floral treasures—the grand Lathyrus splendens, the queen among them all !

C. R. Orcutt.

NOTES ON LOWER CALIFORNIA PLANTS.

I lately had the pleasure of examining an interesting collection of plants made by Maurice Lopatecki on the survey of the coast of Lower California by the U. S. S. Ranger. The Spanish names which the collector has secured, add considerably to the value of the specimens, and are here given after the botanical name.

Triis angustifolia, D. C. var. latiuscula, Gray. Yerba del aigre.
Chitonia simplicifolia, Watson. Yerba del cuervo.
Franseria chenopodifolia, Bth. Misapol.
Galvesia juncea, Gray. Cañutillo?
Astragalus trichopodes Gray. Guarvancia? Fruit poison.
Rhus laurina, Nutt. Lentisco.
Simmondsia Californica, Nutt, Tojova (used with cacao).
Larrea Mexicana, Moric. Gobernadora.
Euphorbia micromera, Boiss, Calandrina.
Viguiera Parishii, Gray, Yerba amargo.
Fonquiera splendens, Engelm, Hocotillo or Palo Adan
Porophyllum gracile, Bth Yerba del Venado.
Pluchea borealis, Gray. Haria.
Atriplex canescens, James, Chamisso.
Dalea Seemanni. Watson. Santimia?
Sphaeralcea Emoryi, Torr. Malva Cimarona.

In the collection were two new species of Opuntia known under the names of tasahio and civire, the latter with fine red blossoms and both growing barely a span high.

Some of the plants it was impossible to positively identify, a few of them probably being new to science. The Copal tree was collected only in leaf; Damiana a pretty malvaceous bush, I have also collected but am not sure as to its proper name.

Æsculus Parryi, Gray, was credited by the collector to Blanco bay; Solanum Hindsianum to Playa Maria bay; Lavatera assurgentifolia to Gervaimo Island.

Veatch's primrose, Fouquiera splendens, copal, damiana, Larrea Mexicana, Simmondsia Californica, Dalea Seemanni, Euphorbia micromera, Sphaeralcea Emoryi, and Franseria chenopodifolia, were among the plants collected in San Andreas valley and the vicinity.

Rutilla appeared to be a species of Lycium, probably L. richii.

The abundance of the beautiful blue palm, Erythea armata, south of San Quentin bay which this gentleman reports is pleasing news. The cirio (erroneously written cereo, in the description, that being the pronunciation), Fouquiera gigantea, he also reports abundant in the interior.

The Adam's tree, Fouquiera splendens, seems to be abundant south of San Quentin bay. It will be remembered that the three species last mentioned I found a year ago near El Rosario mission.

C. R. Orcutt.

DR. ALBERT KELLOGG.

This veteran botanist of the Pacific Coast, died in Alameda, Cal., on the 31st. of March, at the age of seventy-four years. He was a native of New Hartford, Conn. For over thirty years Dr. Kellogg has been identified with the botany of California and the

adjacent region, commencing September 4, 1854, when he exhibited a drawing and specimen of a plant from the salt marshes of the bay of San Francisco, the Franknnia grandifolia, at a meeting of the California academy of sciences, of which he was one of the founders. During all these years he was constantly active, either in the field or the herbarium. He was exceedingly skillful with his pencil and brush in rendering from nature, and up to nearly the last moment was engaged in making drawings of the floral and sylvan species of the Pacific states, particularly the sylva, with the intention of illustrating a work on the indigensus trees of California. He must have left a large and valuable series of figures, if not a completed monograph, of the botanical forms of the region referred to.

The published results of his various and prolonged investigations have appeared from time to time in the proceedings and bulletins of the California academy and elsewhere; and his name holds a conspicuous place in all of the principal works relating to the botany of the western coast of North America

In 1867 he visited the then Russian territory of Alaska in the capacity of surgeon and botanist to the special expedition of that year, having received the appointment from Prof. George Davidson, who had charge of the scientific division on that occasion.

Of his personal qualities, all who knew Dr. Kellogg will bear testimony to his simplicity, genuineness, and purity; and his invariable kindly disposition. His was altogether a rare and most lovable character. It may properly be said that his nature was in many ways as attractive as the beautiful forms he studied. Considering the period of his arrival in California, and the ruling passion and influences which governed the community at that time, as compared with his refined tastes and quiet ways of life a most extraordinary contrast is presented. In the light of ordinary experience, it is hardly conceivable of a human being, among human beings of the same race, more absolutely out of place than he. However incongruous the surging tide and rush of affiairs about him, he held the noiseless tenor of his way. His gentle life has passed. He will be affectionately remembered by many.—*R. E. C. S., in Science.*

PROF. WILLIAM ASHBURNER.

William Ashburner, the well known mining engineer of San Francisco, died in that city, April 20, after a brief illness. The deceased held a high place in his profession, and was greatly esteemed by all who knew him. He was born in Stockbridge, Mass., in 1831. He attended the public schools of his native town In 1849 he entered the Lawrence scientific school at Cambridge and after two years went to Paris, where he pursued such studies

as are requisite to the profession of mining engineer at the Ecole des mines. In 1854 he returned to this country, and, accompanied by the late Prof. Rivot. he devoted several months to the examination of the mineral region of Lake Superior. In 1859 he was engaged in the exploration of a part of the island of New Foundland, and in 1860 he went to California as one of the chief assistants in the state geological survey of which Prof. J. D. Whitney was the director. In 1864 he was appointed one of the commissioners of the Yosemite Valley and the Mariposa Big Tree Grove, a position he held until 1880. From 1862 until 1883 Prof. Ashburner was actively engaged in his professional work, and travelled almost incessantly in the mining districts of the United States, British Columbia and Mexico, also in the more distant regions of South America and Asia.

In 1874 he was made professor of mining in the University of California. In 1880 he was appointed regent af the same University, and was a member of the board of regents at the time of his death. He was selected by the late James Lick as one of the trustees of the California school of mechanical arts, and was otherwise prominent in various scientific and educational societies, and his death will be regarded as a public loss.—*R. E. C. S. in Science.*

THE WEYMOUTH PINE.

"About the sources of the Alleghany River," says Dr. Edwin James in that rare old work, Long's expedition to the Rocky Mountains, "are extensive forests of pine On French creek and other tributary streams are large bodies of lands closely covered with forests, where the great Weymouth pine and the hemlock spruce are intermixed with beech, birch, and the sugar maple. The great white or weymouth pine, is one of the most beautiful of the North American species. Its trunk often attains the diameter of five or six feet, rising smooth and straight from sixty to eighty feet, and terminated by a dense conical top. This tree, though not exclusively confined to the northern parts of our continent, attains there its greatest magnitude and perfection. It forms a striking feature in the forest scenery of Vermont, New Hampshire and some parts of Canada and New York, rising by nearly half its elevation above the summits of the other trees, and resembling, like the palms of the tropics, so beautifully described by M. De Saint Pierre in his Paul and Virginia, and also by Baron Humboldt in his personal narrative, a forest planted upon another forest.

The sighing of the wind in the tops of these trees, resembles the scarce audible murmurings of a distant waterfall, and adds greatly to the impression of solennity produced by the gloom and silence of the pine forest. In the southern parts of the Alleghany Moun-

tains, pines are less frequent; and in the central portions of the valley of the Mississippi, they are extremely rare."

It has been a pleasure to transcribe the above because it reminded me of a ride, quite unique to me, through a pine forest in the eastern part of Vermont, many years since. The aroma from the pine trees was delicious and strengthening, and the wind as above alluded to, sighing through the branches seemed to be a mystery to our young horse and he hastened on with inc easing speed as if to distance his pursuer, but the road was level and straight forward, and fearlessly we rode on with the speed of the wind. The grandeur of the tall pines on either side of the way, their fragrance and their music, the apparent apprehension of animal life for its safety, the route never before passed, the novelty of the scene was all recalled by Dr. James' description of the great white pine.

E. E.

THE FLOWERS HE BROUGHT.

The music of the rippling brooks,
  And all the sweetness caught,
From tarrying in woody nooks,
  Came with the flowers he brought.

The morning light of May was there
  With all its beauty fraught,
And love, a tender bud, and fair,
  Came with the flowers he brought.

Its presence lighted up the room,
  And hallowed every thought,
And to my heart a richer bloom
  Came with the flowers he brought.

San Diego, Cal. *E. E.*

BORED BY ANTS.

The most dreaded insect invader is the white ant. In Africa, their houses are dome-shaped mounds often eighteen feet high. These insects erect pyramids one thousand times higher than themselves! These ants on their travels so conceal their approach that their presence is not suspected until the damage is done. They usually tunnel into any object which they attack, often reducing it to a mere shell. In this way they have been known to ascend within the leg of a table, devour the contents of a box upon it and descend through a tunnel bored in another leg, all in one night. An officer of the English army while calling upon some ladies in Ceylon was startled by a rumbling sound. The

ladies started with affright and the next instant they stood with only the sky above them; the roof had fallen in and lay all about, leaving them miraculously unharmed. The ants had made their way up through the beams, hollowing them out until a great part of the frame-work of the house was ready to fall at the slightest shock.—*St. Nicholas for June.*

ELECTRICAL NOTES.

An electric light dynamo in London is driven by a steam engine which is said to make 12,000 revolutions per minute, and is claimed to be the first motor ever made to work at the actual velocity of the steam as it escapes from the boiler.

Penkert has determined that in the Swan electric lamp the proportion of energy converted solely into light is 28.1 per cent.; in the Siemens, 27.9; in the Edison, 26.5; and in the arc lamp, 38.3.

In a cannon foundry at Bourges, France, electricity has been successfully applied to mechanical purposes for more than five years, two large movable cranes, each weighing over twenty tons, having been worked by electric motors without difficulty.

Of the common notion that electricity plays an important part in the production of earthquakes, Prof. Joseph Le Conte well says: 'I never heard or read the slightest scientific proof of this theory. Electricity has taken hold of the popular imagination, so that any inexplicable thing is explained by 'electricity.' For example, vital force, nerve force, etc., are inexplicable; so many lay it to electrical force. So, also, with earthquakes—electricity is made the scapegoat.'

The British and Colonial Druggist says that the latest application of electricity appears to be in veterinary practice. Professor Place, of the Saumur Cavalry School, has devised an electric bridle, by which such a series of shocks can be administered to any vicious horse that the animal is speedily rendered tractable either for shoeing or for other purposes. A small battery and induction-coil are employed to supply the current, and thus the uses of electricity increase.

ABOUT METALS AND MINERALS.

Zinc seems, by the four actual weighings that were of any value, to be not acted on by mineral lubricating oil, least by lard oil and most by sperm oil when used as lubricants.

Pure gold is worth about $602,793 per ton and pure silver about $37,705 per ton.

A German chemist, Prof. C. Winkler, has discovered a new element, 'Germanium,' in a mineral named Argyrodite, which consists chiefly of sulphur, silver and mercury.

Salts of copper—usually regarded as very poisonous—have been administered by a French chemist to dogs and rabbits without serious effects, either from large doses or from a long continued regular use of the substances.

An Italian physicist, Signor Bombicci, seeks to account for the fact that meteorites are largely composed of iron by supposing the earth's magnetism to be the influence which chiefly attracts the floating fragments of space. This view is supported by the large finds of meteoric stones near the accessible pole of our planetary magnet.

NECROLOGY.

A young Italian mycologist, the Abbe Ben. Scortechini, an explorer of Australia and further India, died lately at Calcutta. A genus of fungi commemorates his services.

Dr. Didrik Ferdinand Didrichsen died on March 19th, aged seventy-two years.

CORRESPONDENCE.

LOWER CALIFORNIA.

[The following is in reply to a criticism of the International Co. of Mexico for indicating, on the maps issued by them, as "rich farming land" the eastern part of northern Lower California that forms a portion of the so-called Colorado Desert. ED.]

"I note what you say about the words on a portion of our map, "Rich Farm Land." These were put there under the following circumstances: When I took hold of Kansas in '68, '69, '70 and '71, all the maps then extant of this country had the words "Great American Desert" printed across the Western half of Kansas. I had the lands examined by Agassiz and found that under the light surface soil or sand there was a deep black loam. I published his analysis of the soil widely, with the result that the "Great American Desert" was effaced from the maps and I had the pleasure of doubling the population of Kansas within two years. I was at this time General Manager of the Company which handled the lands of the Kansas Pac. Road, extending from Kansas City to Denver. I mention all this in connection with these words which you refer to on our map of Lower California. I had the examination of a man, a practical farmer, and one of the best land men I know, for the district you refer to. He reported to me that under the light surface soil or dust there

existed a soil of greater fertility than he had seen in Southern California. It was both dark and deep, and could eventually be irrigated by turning upon it the water from some of the rivers. Unless this man made a misstatement to me—which, knowing him well I should not think possible—the lands you refer to are rich in themselves and capable of being cultivated at no distant day.

Yours truly, *W. E. Webb,*

New York, May 18, 1887. Land Com., Int. Co. Mex.

MINTS WANTED.

For two years I have made a special study of the genus Mentha, and I am now occupied with the interesting forms of M. Canadensis, L. I would like all the forms you have in Southern California—the more specimens you can get the better it will be—as well in bud as in a state of fructification. All the materials will be utilized in a future monograph at which I am now working, if I have specimens enough at my disposition. I need the mints of Western America to compare with the East American and Siberian forms.

John Briquet,

5 Rue de l'Eveche, Geneva, Switzerland (via England).

DIATOMS WANTED.

I am desirous of obtaining specimens of Marine Algæ from the Pacific Coast bearing diatoms in situ. Also, specimens of diatomaceous material, either recent or fossil. I am willing to pay in money for the above. If you have such material please state price and I will at once remit. Yours very truly,

George A. Bates.

Salem, Essex Co., Mass.

TO THE SUBSCRIBERS OF THE "NATURALISTS' COMPANION."

Having decided to enter Eastman's Business College of Poughkeepsie, N. Y., I have been obliged to discontinue the publication of the *Naturalists' Companion*, and have transferred the subscription list to The West American Scientist a very worthy publication and one that will, undoubtedly, give better satisfaction than any other periodical of its kind. Before concluding, I wish to thank my many readers for the support and help they have rendered me while publishing the *Companion*, and hope they will treat Mr. Orcutt in a like manner. He, on his part, will do all in his power to give the readers a first-class magazine. Hoping this will be entirely satisfactory, I am,

Yours for Science,

Chas. P. Guelf.

A RENEWAL.

Enclosed, please find $1 for my subscription to THE WEST AMERICAN SCIENTIST. Allow me to thank you for the pleasure your journal gives me each month. *H. C. Ford.*

Pres. Nat. Hist. Soc., Santa Barbara.

ANOTHER CORRECTION.

Please make another correction to the reported proceedings of the Santa Barbara Soc Nat. Hist.: The article on 'Fossil Botany and the Advantages of its Study,' which I herewith send, was an emenation of the writer hereof, and *not* 'by H. C Ford,' as given in the SCIENTIST. I intend to write a series of articles on the subject and will send them to you.

In relation to the domestication of wild turkeys, some one has blundered. Judge J. D. Caton, author of an interesting work on 'The Deer of America,' is a resident of Illinois, and at a meeting of the Santa Barbara Society of Nat. Hist., spoke of his experience in the domestication of these birds *but not at or near Santa Barbara!* Santa Barbara wants all the credit she is entitled to, but Illinois would not like to have us steal her thunder nor appropriate so valued a citizen for our own.

Lorenzo G. Yates.

SANTA BARBARA, April 28, 1887.

EDITORIAL.

The Naturalist's Companion. The good will, subscription list, and other belongings to this excellent magazine have been merged into the WEST AMERICAN SCIENTIST for reasons given elsewhere by the editor of that journal. The contributors are expected and cordially invited to continue with us, while we hope the subscribers will find it to their advantage to do the same

OUR CIRCULATION. The editor finds to his gratification that the WEST AMERICAN SCIENTIST now reaches regularly thirty-two of the states and territories of the Union, besides Canada and various foreign countries, and that quite a bundle goes to the most of them. It is truly becoming national in circulation, though the larger portion of our patrons are in the southern counties of California, and the journal owes much of its success to the popular style in which subjects are presented to our readers, making what would otherwise be of only local value of general interest to those in the east as well as to those in the west.

ILLUSTRATIONS. Through the kindness of W. E. Webb. Land Commissioner of the International Co. of Mexico, New York, we shall be able to give a series of illustrations of Lower California scenery, trees, and plants, beautifully engraved by the Moss Photo

Engraving Co. from photographs. These illustrations will accompany a series of articles on this country, rendered familiar to the editor by frequent botanical trips in the past.

PICTURESQUE SAN DIEGO is a work of which San Diegans may well feel proud, and we are sure the scenery of San Diego county, presented in so artistic a style, will bear comparison with that of any land, and that the book will meet the expectations of all.

THE COLORADO DESERT. The letter given elsewhere from the Hon. W. E. Webb tends to show that the eastern portion of the county, and of northern Lower California, equals, in fertility of soil, the western. His reference to Kansas, reminds us of the experience of a lady in this county, who, upon first viewing the broad level plains, was so strongly reminded of her former Kansas home as to become homesick, and she said, "I sat down and cried." The rank vegetation said to grow on the desert when heavy rains fall in that region, proves the natural richness of the soil, but a portion of the land is practically worthless from its mineral character, and the whole is and will be barren and virtually a desert until vast irrigation schemes are carried out.

TO READERS.—We need more money and we should have it if each reader that has subscribed would promptly pay in advance. We are supplying a magazine pronounced the best of its class. We charge less than many ask for journals of less merit. One dollar is cheap for 300 pages such as we propose giving yearly. If not a subscriber you can afford to become one; if already one you can afford to pay in advance.

LIFE SUBSCRIBERS.—We herewith make the following offer: For ten ($10.00) dollars paid at any one time we will send this journal to any address during the life of the subscriber, or so long as the journal may be published. We want 100 life subscribers at once. Who will be first?

NATURAL HISTORY is not an exact science. The 'old style' of books and teaching left no questions open, left the student no reason to doubt that all questions are forever settled. The new style of text books and teaching would direct the pupil to new fields of research, discovery and of careful thought. Biology is not a science to be learned as we would learn to add, multipy or subtract in arithmetic, but to be learned by comparison and by observation.

DR. ALBERT KELLOGG.—We are pleased to give a brief sketch of the life of this genial botanist from the pen of his colaborer in science, whose initials will be quickly recognized by many of our readers. One of the pleasantest recollections of a visit to San Francisco in last December is that of the gentleman and scholar, who so truly seemed out of place in the dismal academy building and whose fervent "God bless you" at parting will be long remembered.

NOTES AND NEWS.

M. De Valayer claims to be the inventor of the postage stamp.

The first daily newspaper appeared in 1702.

Two human vertebræ found at Saratoga Bay are regarded by Prof. Heilprin as conclusively proving the existence of prehistoric man in Florida at a very remote period.

It appears that there are now inhabited cave dwellings in Saxony. They are dug in a sand-stone hill, have different rooms, light and dark, as well as chimneys, windows and doors, and are said to be very dry and habitable.

Five attempts have now been made to replace the diseased human eye by the healthy eye of an animal, and in one case the experiment has been successful.

An Italian physician recommends the daily administration of about 75 grains of borax as a preventative of cholera, his observations having shown that workers in borax factories in cholera districts always escape the disease.

The world's 94 geographical societies contain 48,600 members.

The postage stamps of Russia are the only ones in the world printed in water colors.

A TWO FOOT RULE.—Keep your feet dry.

A German investigator, Semmola, has succeeded in producing musical tones from a metal plate by electrifying it intermitantly from an induction machine, the wires being attached to opposite sides of the plate and the path of the current interrupted so that sparks strike across.

Nitro-glycerine is probably the most popular of the new remedies recently adopted by physicians.

The larger animals are being rapidly exterminated in Algeria, and the lion of the desert is fast becoming a myth. During the eleven years from 1873 to 1884 bounty was paid on 202 lions, 1214 panthers, 1882 hyenas and 27,000 jackals.

An autograph letter of George Washington recently brought $75 at auction.

An unusual number of white varieties of animals have been noticed it Germany this winter. A white chamois was shot in the Totengebirge, a white fish-otter was caught near Luxemburg, white partridges were shot near Brunswick, and a white fox was killed in Hessen.

It appears that the crocodile, like the faith which formerly esteemed it sacred, is practically extinct in Egypt. The steamers plying the Nile have had more to do with driving it from that river than the guns of sportsmen, according to Prof. A. H. Sayce.

The medical school of Japan is 1,100 years old.

LITERATURE.

A BIRD'S EYE VIEW of the City of San Diego has been received from the publishers, the San Diego Union Co.

EXCELLENT MAPS of the San Vicente Basin, Lower California, showing the topography and quality of the soil south of Todos Santos Bay to San Ramon, have been received from W. E. Webb, land commissioner of the International Co. of Mexico, New York.

ANNUAL REPORT of the Trustees of the American Museum of Natural History, Central Park, New York, for 1886–7 is at hand.

OUR COTEMPORARIES are well represented in the advertising pages of this journal but we owe many of them something more for the very friendly notices they have given of the WEST AMERICAN SCIENTIST in recent issues. However, we shall not attempt to enumerate the good features or even mention the names of them all. We have before mentioned the change in the editorial management of the *American Monthly Microscopical Journal*, Prof. Henry L. Osborn, of Lafayette, Ind., taking charge during the absence of Prof. Hitchcock in Japan. *The Microscopical Bulletin*, issued by Queen & Co., of Philadelphia, continues bi-monthly and excellent as well.

The American Naturalist shows a decided improvement in appearance since the Lippincott Co. have become publishers; Edw. D. Cope and J. S. Kingsley are the leading editors under the new management, with an able staff of specialists for the departments. *Kosmos* has reached our table but once in the first two issues. We learn that another journal, to be devoted to science and art, is soon to be started in San Francisco under the title of the *American Scientist.* The editor of the *Hoosier Naturalist*, Valparaiso, Ind., reports prosperity, and maintains the popular character of that low priced monthly. *Science* continues to reach us weekly with scientific and educational discussions, and the latest news of the day that render this journal so nearly indispensable. *Popular Science News*, of Boston, issued monthly, and the *Scientific American* are both practical journals for the artisan and the general public.

The Conchologists' Exchange improves with age.

The Youth's Companion gained 25,000 in circulation the past year, a success which it well deserves. Twenty tons of paper are consumed weekly in its edition of nearly 400 000.

St. Nicholas reaches our table every month a little before the mammoth *Century Magazine* fills up our box at the post office. It is hard to tell which is read with the greatest pleasure by those for whom they are respectively prepared. There is yet hope for the American nation when such magazines, full of good and instructive reading, have so large a circulation.

An interesting field for scientific research has been opened by Prof. S. P. Langley by the discovery that the heat radiated from the soil is of an almost totally different quality from that which comes from the sun.

A Neapolitan physician has described a case of hysteria, prolonged and aggravated, in which the nails of the fingers and toes were spontaneously shed. This was preceded by tingling, especially in the thumbs and great toes, followed by suppuration in the bed of the nail. The curious affection of the nails is supposed to have been a result of disordered nerve function.

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Mention this Magazine.

The West American Scientist.

Vol. III. JULY, 1887. No. 27.

AN ANIMAL ARMY.

Marvelous invaders are the lemmings. They are near relatives of the short-tailed field mouse, and are about five inches long, with round heads, brown fur, and bead-like eyes. Their home is in the highlands, or fells, of the great central mountain chain of Sweden and Norway, where they build nests of grass for their young. The lemmings are spiteful little creatures when aroused, sitting up on their hind legs and fighting with a will. Not only are they pugnacious, but extremely restless and migratory as well; and every five, ten, or twenty years they seem possessed by a desire to see foreign lands.

Thereupon, they one and all leave their settlements and start out in tens of thousands, overrun the cultivated tracts of land in both Norway and Sweden, and ruin the plants and vegetation. They march only at night, pressing on slowly in one straight course, and allow nothing to disturb them. Birds and various animals follow and prey upon them; but, notwithstanding this, they actually increase in numbers, gaining recruits as they advance. Rivers are swum and hills crossed, until, finally, the Atlantic or the Gulf of Bothnia is reached.

But, still impelled by the same blind instinct that has led it onward, the entire vast concourse plunges into the sea, swimming onward, the little animals piling one upon another as they are beaten back, until at times their bodies have formed veritable sea-walls. Boatmen returning to the beach have found their way obstructed by a struggling horde that has just reached the sea. The number of lemmings in these bands is beyond all computation. Sometimes the march is kept up for three years before the water is reached.—*C. F. Holder in St. Nicholas for June.*

GEMS BY THE PECK.

The French crown jewels are sold. Tiffany & Co., from whom we received a catalogue of this magnificent collection lately, purchased over one-third of the entire amount. The French government refused to put the famous "Regent" up on the ground that it might fall into American hands. The sale amounted to near $1,335,000.

THE ABORIGINAL CALIFORNIA MINT.

In the vicinity of Santa Barbara, fifty years ago, still existed the original (or aboriginal) Mint of California. The Indians of Tulare County generally visited it once a year in bands of twenty or thirty, male and female, on foot armed with bows and arrows. They brought with them panoche, or thick sugar, made from what is now called honey-dew and from the sweet Carisa cane, and put up into small oblong sacks made of grass and swamp flags; also nut pipes and wild tobacco pounded and mixed with lime, which preparation of native tobacco was called *pispewat* and used for chewing. These commodities were exchanged for a species of money from the Indian Mint of the Santa Barbara rancherias, called by them "*ponga*." This "ponga" money consisted of pieces of shell, rounded, with a hole in the middle, made from the hardest part of the small, edible, white mussel of the beaches, which was brought in canoes by the Barbarians from the island of Santa Rosa. The worth of a rial was put on a string which passed twice and a half around the hand, *i. e.*, from the end of the middle finger to the wrist. Eight of these strings passed for the value of a silver dollar.—*Coin Collector's Guide.*

A NEW LOCALITY FOR CHEILANTHES MYRIOPHYLLA, DESV.

Read before the Santa Barbara Society of Natural History, May 28th, 1887.

This Mexican and South American fern which has been sometimes erroneously referred to Cheilanthes Fendleri, and which was found by Mr. Spence growing on the high mountains of the eastern portion of this county, has recently been collected on Santa Cruz Island by Mr. Ford,—probably a remnant of the flora of the time when the Channel Islands formed a portion of the main land, as the fossil elephant of Santa Rosa Island was a remnant of the fauna of the same period. *Lorenzo G. Yates.*

THUNDER, LIGHTNING AND RAIN.

Meteorologists have found that there can be no thunder and lightning without rain. When thunder is heard beneath a clear sky, the reports must either come from distant clouds, or be the result of some other cause than a discharge of electricity. Harvest or heat lightning is produced by a distant storm. Thunder seldom accompanies heat lightning, the sound reaching only about twelve miles, while lightning is often seen, by reflection upon nearer clouds, at a much greater distance.

SUMMER SCHOOL OF SCIENCE.

The summer school of Science, under the direction of the Pacific Coast branch of the Chautauqua Literary and Scientific Circle, arranged for classes daily in the study of the natural sciences, under Dr. C. L. Anderson, Profs. Geo. Kleeberger and Josiah Keep, at their annual session for 1887, at Pacific Grove, Monterey, California, July 5th to 15th.

The interesting programme prepared, gave the following addresses among other attractions:

July 6th.	Layers of Vegetable Growth, Prof. C. B. Bradley.
	Peculiar People Abroad, G. L. Spinning, D. D.
July 7th.	What a Botanist Saw in Europe, Dr. C. C. Parry.
July 12th.	The Zodiac, Prof. Josiah Keep.
	Up and Down Mt. Blanc, J. K. McLean, D. D.
July 13th.	Manzanitos of California, Dr. C. C. Parry.
	The Labor Problem, C. C. Stratton, D. D.
July 14th.	Mind and Brain, Dr. J. H. Wythe.

EDITORIAL.

PICTURESQUE SAN DIEGO has unexpectedly been delayed by the weather from appearing as early as looked for. Photogravure plates are practically photographs in printers' ink, requiring a sunny exposure in printing, the same as heliotypes and artotypes, which are produced in a similar way.

WE HAVE RECEIVED a pleasant call from W. A. Goodyear, of the State Mining Bureau, San Francisco, and another from F. Stephens.

AN INVITATION to the commencement exercises of the University of California is received.

VALUABLE PUBLICATIONS are at hand from Prof. E. L. Greene, Dr. C. C. Parry, Dr. J. G. Cooper, Prof. Josiah Keep, Messrs. Edward Potts, Chas. H. Bollman, D. W. Coquillett, F. Crepin, John B. Alden, T. H. Lewis, W. R. Lighton, Hon. E. M. Goodwin, Dr. Geo. Vasey, Dr. H. R. Rogers, and others. Further mention of some of these will be given in a future issue.

WEST COAST SHELLS will consist of about 200 pages, and contain near 180 illustrations of our mollusks. We have not learned the price, but orders may be sent to the editor.

THIS ISSUE is smaller in size than usual. The August number we trust will 'make up.'

Henry Willey, New Bedford, Mass., has prepared an 'Introduction to the study of lichens,' with a supplement and ten plates. Price, $1.00. Readers, send for a copy.

ST. NICHOLAS FOR JULY.

St. Nicholas has a strongly patriotic flavor, appropriate to the Fourth of July. Even the Brownies become imbued with the pre valent enthusiasm, and celebrate the day at night. Miss Jessie C Glasier, a new writer, contributes an amusing sketch of negro child-life, called "A Gunpowder Plot," which is capitally illustrated by E. W. Kemble. Miss Lilian Dynevor Rice presents "A Fourth of July Record" in bright and clever verse. "Betty's Sunday,"—charmingly illustrated by R. B. Birch,—carries us back to the War of 1812, and tells of a brave little American girl's adventure with the enemy. The installment of "Winning a Commission," too,—with its pictures of cadet life at West Point,—falls in line with these timely attractions of the number.

HOPE FOR CONSUMPTIVES.

Queen and Co., Phila., have issued a pamphlet on a new treatment of the aff ctions of the respiratory organs, and of blood poison by rectal injections of gases, after the method of Dr. Bergeon, by Dr. V. Morel, 21 pages, octavo, price 25 cents. This work, translated from the French by L. E. Holman, will be of special interest to physicians, presenting, as it does, a possible though dangerous means of curing hopeless cases.

NOTES AND NEWS.

A petrified log ten feet long and fourteen inches thick was found in Meco, Kansas, recently.

A dictionary giving scientific and technical terms in all languages is projected by Prof. Vilanova, and is endorsed by the International Geographical Congress.

Hydrophobia is unknown in Lapland, but Pasteur has just shown that the dogs may be inoculated with the disease.

The flatness of Denmark is something remarkable, a recent geographical discussion having shown that the loftiest mountain of the country is only 535 feet high.

The proportion of colors in eyes in Italy is thus estimated by Prof. Mantegazzi: Black eyes, twenty-two per cent.; chestnut, sixty-four; blue, eleven and gray eyes, three per cent.

The diminished cost of production in metal work was illustrated recently by Dr. John Percy, in an address to the British Iron and Steel Institute, by the statement that a gross of steel pens, formerly costing $35, might now be produced for eight cents. The cost of making gold chains has been reduced to an eighth of what it was.

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THE

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Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - EDITOR.

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Vol. III. AUGUST, 1887. No. 28.

*BEAUTIES OF THE SEA.**

The ocean is a great home. Its waters are full of life. The rocks along its shores are thickly se with living things; the mud and sand of its bays are pierced with innumerable burrows, and even the abyss of the deep sea has its curious inhabitants.

Huge whales steam along near the surface of the ocean; fishes of a thousand kinds are at home a little lower down; crabs and lobsters, star-fishes and sea-urchins creep along the rocks or make their way through the masses of seaweed which grow near the shores. Clams and oysters lie on the bottom; sea-snails, with their curious shells, mussels, barnacles, and a host of inferior creatures, all find their proper places in this great ocean home.

We are not able to see all that is going on under the water; in fact, our field of observation is quite limited; but by keeping a sharp lookout we may be able to discover a great many interesting facts, and to make very probable guesses as to things which we cannot clearly observe.

So come with me some fine summer morning down to the ocean beach. We will choose a day when low tide occurs about sunrise, and we will be promptly on hand at that hour. There is a light fog floating over the water, and as we come down to the shore. we are surprised to see what a broad stretch of mossy rocks has been left bare by the retreating tide.

We walk quickly across the sandy beach clamber over the slippery rocks as far as the water will allow us, and then we look and listen. Some distance out the big waves come rolling in, smooth and glassy, till they strike the shoaling bottom. There the lower part of the wave is stranded, but the top by no means loses its shoreward motion. Rushing forward, it curls and breaks into foam with a roaring splash, while the water at our feet, feeling the impulse, presses in between the rocks with a soft murmur, and then flows back again to meet the next incoming wave.

There are tones of music in all this never-ending motion of the sea which can hardly be described, but which bring to the ear of

*) From advance pages of West Coast Shells, by Josiah Keep. Copyrighted.

the sympathetic listener the sweetest of nature's harmonies The deep bass of he breakers mingled with the lighter notes of the throbbing wavelets, the dripping of the mossy rocks, and the rustle of little crustaceans—all these sounds, united with the sweet breath of the sea, and joined with the lovely forms and beautiful colors which are all around us, all these make us believe that we are in fairyland, and we almost envy the mermaids in their homes among the coral groves, where the draperies are mosses and the pavements are of pearl.

But we see no mermaids here, though there is plenty of life. Here is a huge arching rock, and under it is a pool of the clearest sea-water.

We stretch ourselves upon the soft moss, and partly enter the charmed grotto. In the pool are a few bright fishes, which dart around their little ocean, evidently alarmed by our presence. As they swim through the shallow water, they brush against the slender mosses, which wave to and fro and display their graceful forms; or perhaps they touch the frond of an irridescent sea-weed, which, as it moves, reveals its beautiful colors.

On the bottom, or attached to the sides of the stones, are star-fishes of brilliant and varied hues—red, yellow, purple and brown —contrasting strongly with the green sea-grass, and making it seem as if the sky had last night sent a shower of stars into the ocean, and some of them had been left when the tide ebbed away.

Brilliant patches of living sponge—scarlet orange, or drab—paint the dark rocks; colonies of lace-like polyzoans are scattered over the stones and old shells; pretty sea-snails are creeping slowly along the roof of our grotto, or quietly waiting, with all imaginable patience, for the return of the tide; strange tunicates and other low forms of animal life add to the beauty of form and color, and excite our curiosity to know what they are and how they live; sea-anemones—those living flowers—open their tube-like petals and glow in the morning light; and a host of other things, "creeping innumerable"—all welcome us to this beautiful home in the sea.

Our liveliest hosts are the little crabs, which scamper off sidewise, forwards, or in any other direction, as we approach, crowding into the narrowest of cracks, whence they peer out with their curious stalked eyes, while they stand ready to defend themselves with their jaw-like claws. If we manifest no hostile intent, they will quickly come creeping down again, and begin anew the business of the day. How their glossy shells shine!—white, green, red, or brown, or perhaps combining all these colors in harmonious patterns.

There is such a thing as getting into sympathy with all these humble animals; and, as you lie on the rocks and admire the wondrous combinations of form and color, equaling in beauty the finest gardens of the dry land, there is such a thing as feeling an intense sympathy with all these humble creatures, and losing all

thoughts that you are here for study in the consciousness that you are among friends.

How you wish to become acquainted with them all; to learn their habits and enter into their instincts and feelings! But, as among our own kind, we cannot possibly become acquainted with one in a thousand of all the good people on the earth, so, here in the sea, we must necessarily choose our special friends, and wait for future opportunities to become better acquainted with the others.

For good reasons, to my mind, I have chosen the *Mollusks* as special objects of study, and now wish to introduce them to any one who is seeking to make pleasant acquaintances. I will vouch for it that there is not one of them that carries a bag of poison, or that will harm you in the least; and if you only approach them in a friendly spirit, they will stand ready to give you the best of their possessions, and make your life sweeter and happier for having known them. *Josiah Keep.*

SOME ADDITIONS TO OUR STATE FLORA.

Malva parviflora, Linn.

This plant is so very common, and grows so very luxuriantly in many parts of California, that one cannot treat of it as an addition to the State flora save in name only. It already has a place in our books, but under the wrong name of Malva borealis. It was known to the early collectors on the coast and no doubt became established here before the advent of our English speaking people. Douglas collected it, and, on the strength of his specimens, it obtained at the hands of Torrey and Gray a new name, as a supposed new species. It is clearly the Malva obtusa, n. sp., of their flora. Those authors say nothing about the size of the plant, but they describe the stem as being prostrate. So it is when found along our sidewalks, late in the season, but in these instances it has been stunted and depressed by busy feet or trailing garments of passers by. It is a very different thing as seen growing in sheltered fence corners and elsewhere, well nourished and unmolested. Under these conditions it usually grows perfectly erect and to the height of five or six feet. This is its ordinary stature about Berkeley; but last August at the mouth of a canon near the sea shore, some forty miles above Santa Barbara, I walked amid a thicket of it fully ten feet high. In all its forms, great and small, it is easily recognized by that character from which it takes its name, the very small corollas, which are white and scarcely exceed the calyx. The calyx also is very characteristic, at least in fruit, being then considerably enlarged and but very slightly lobed, the border spreading away like a flat rim around the flattened circle of very minutely and sharply rugose carpels My own library of Old World botany, supplemented by a very fine suite of specimens of Old World Malvæ in the herb-

arium of the California Academy, have led to this identification of the species, and to the displacement of the name M. borealis given for it in the botany of the State Survey and in Rattan's Flora.

Malva Nicæensis, Allioni.

This species, quite common about Berkeley, Oakland and Alameda, has not been credited to the State or coast. It is a lower, more hairy plant than the preceding, readily distinguished by its half-inch long rose-purple corollas, calyx in fruit folded over the carpels, instead of spreading away from them, and carpels obtusely and indistinctly wrinkled. It would be well for the botanical readers of the Scientist in different parts of the State to look after the mallows in their respective localities and see if this species will not be found elsewhere than about the Bay. I may add that Malva rotundifolia, so common in waste places on the Atlantic coast, although it has been cultivated for years in the University garden, has not yet escaped, though it doubtless will eventually find itself naturalized.

Paronychia Chilensis, DC.

Not having been privileged this season to make excursions to remoter fields of botanical research, I have inspected more carefully some small tracts lying near home, with results that justify the conclusion that even the streets of our metropolis are yet fair botanizing ground. Here is a plant supposed hitherto to be restricted to a coast of the southern hemisphere. It is by no means a rare plant on grassy knolls about the Presidio in San Francisco, where it is just as clearly and unquestionably indigenous as is its relative, Pentacæna ramosissima, which, by the way, is plentiful in the same and other localities. This Paronychia bears a rather close resemblance to the Pentacæna, and is distinguished from it mainly by being a little puberulent, lacking the spinose appendages of foliage and calyx, and thus being quite innocuous to the touch. Its prostrate and matted branches are from a few inches to a foot and a half long, and, to the eye of a casual observer, might pass for those of a Polygonum of the Avicularia or knot grass group.

Thelypodium Lemmoni, Greene, n. sp.

Robust and tall, 3–6 feet high, glabrous and slightly glaucous; lower leaves 6–10 inches long, including the short petiole, 3 inches broad, coarsely and angularly lobed below, repand-toothed above, the uppermost nearly entire, of lanceolate outline, tapering to a narrow base; racemes rather loose, a foot long; petals whitish, 3 lines long, exceeding the lilac-purple spreading sepals; stamens exserted; pods ascending on peduncles of a line or more in length, not stipitate, slender, somewhat torulose, more than 2 inches long, acuminate.

Lemmon's Ranch, in the mountains of San Luis Obispo County 1887, collected by Mr. and Mrs. J. G. Lemmon, long known as zealous and very efficient laborers in various portions of the wide field of West American botany. Their new home is well located for botanical pursuits. as this and the following charming novelties may indicate, both being from the same district, and comprising a part only of their this year's store of good discoveries.

ESCHSCHOLTZIA LEMMONI, Greene, n. sp.

Annual, 6–12 inches high, with numerous ascending branches leafy below, hoary pubescent throughout, even to the capsules, with short spreading white hairs; leaves with elongated petioles; peduncles stoutish, quadrangular, the earliest scapiform; torus urceolate, 3–4 lines long, nearly glabrous, constricted just below the narrow, erect hyaline border; calyptra ovate, long acuminate, very conspicuously hairy; petals orange-color, nearly or quite an inch long.

Mr. Lemmon, who, under the doctrine of the 'Botany of California" that we had but two species of Eschscholtzia, long neglected the genus, has, at this late date, found a new species, which is the most striking of them all in aspect. The long urceolate torus which, at the time when the petals fall, completely encloses the ovary, is the only smooth part of the plant, while the calyptra is the most densely pubescent part, and being broad at base, while the torus is narrowest next to it. the buds have the outline of those of a rose or fuchsia. There are other interesting Eschscholtzias in Mr. Lemmon's collection requiring further study and comparison.

CHÆNACTIS TENUIFOLIA, var. ORCUTTIANA, Greene, n. var.

Stouter than the type and somewhat depressed; leaves thickish and more than once pinnatifid, the secondary lobes short and obtuse; flowering branches and involucre resinous-glandular; plant flowering in summer, after the disappearance of the vernal type.

Along the beaches about San Diego, collected by Orcutt, Cleveland, Parry and others, none of whom are willing to have it called *C. tenuifolia*. It will very possibly claim the rank of a species, but, if so, on the strength of differences in the vegetative organs and season of flowering only. It has no carpological character. It is alluded to, as a form, in the Synoptical Flora. The least we can do is to name it as a well marked variety.

Edward L. Greene.

SANTA BARBARA FERNS.

[Read before the Santa Barbara Society of Nat. Hist.]

Another addition to the list of ferns of Santa Barbara County has been made by Mr. John Spence, who found it last year growing in the high mountains in the extreme northwestern portion of the county.

The specimens brought in last year were immature and I was not assured of its identity until he brought in some fruited specimens from his recent trip to the same locality.

It proves to be Cystopteris fragilis, Bernh; the Brittle Bladder Fern of English writers; It has a host of synonyms, scientific and otherwise, and is widely distributed and known throughout the world.

The name of the genus is derived from two Greek words, meaning respectively, bladder and wing (Pteris, from the Greek *pteron*, a wing is used frequently as synonymous, with the name fern, from its having been originally given by Linnæus to the common Bracken or Brake); the specific name is from the Latin and signifies tender, delicate, or brittle, so that the common English appellation is a literal translation of its technical name.

The genus is peculiar in its distribution, having its headquarters in the temperate zones of both hemispheres.. It is found throughout Europe and Asia, everywhere from Iceland to Kamschatka, from the Arctic regions to Madeira and Himalayas up to fifteen thousand feet elevation; the mountains of Abyssinia and Fernando Po, South Africa, Van Diemen's Land, New Zealand and Hawaiian Islands; Temperate North and South America, and in the mountains of the intermediate tropical zone.

Lorenzo G. Yates

THE 'KITCHEN MIDDENS' OF SANTA HELENA BAY, COSTA RICA.

On the west coast of Central America, in the beautiful bay of Santa Helena, by the Americans called Elena Bay, there dwelt once a tribe of people—the hunters and fishermen of the Neolithic period. Not exposed to the rigid influence of a severe climate, and not forced to defend themselves against wild beasts, those primitive inhabitants of the seashores lived happily under the sky of an absolute blue, and in the midst of a magnificent nature.

The great rubbish heaps on the shores of the Bay, and similar to the "Kjökking moddings" of Denmark, are the sole remnants of the ancient life of this perished people. These heaps are principally composed of different shells as Solarium perspectivum, many Cypraeae, Olivael, great tritons, oysters, and of numerous, broken fragments of mother of pearl. Bones of peccari, stag and procyon are also found, but those of fishes are too broken to be classified. There is no vestige of cereals nor of plants.

As for the kitchen debris themselves, they form heaps from 1 to 3 yards in height by 100 yards long, and 5 to 7 yards wide, and are situated a very short distance from the shores of Santa Helena Bay, and seldom raised more than 3 yards above the level of the sea. The reader will thus see that their general appearance is

very similar to the Kitchen Middens of Denmark. The coal cinders of ancient hearths are still visible, and one thick cinder deposit divides the Kitchen Midden in two equal parts. It seems that the original dwellings were destroyed by fire, and new huts built in the same place. It is thus evident that the deposit under the cinder strata is older than the upper one, and that in the lower one we have to look for more ancient traces of this Neolithic people.

A certain number of stone implements are buried in those heaps, some of them are rudely fashioned, and resemble those of the diluvium of Europe, others are of better workmanship, and are even polished by grindstone. None of those stones are pierced, they are pointed and look like a rough kind of wedges, what they in all probability were.

Green obsidian and silex are also found in the Kitchen Middens of Santa Helena. The last species, I presumed, served in all probability as a firestone—a supposition which soon became a well established fact. Digging in the strata, the writer of those lines found a piece of pyrite, which, of course, was used to procure fire by striking it against the silex.

The strata of Kitchen Midden contain the remains of pottery, but the utensils are reduced to mere fragments. They are made of clay mixed with sand and carbonate of lime, imperfectly baked with fire or sun dried. The fragments are black, brown or painted with different colors. The first two are of older origin, and are found in the under strata that is under the cinder line, the latter are of more recent fabrication, and are ornamented with painting in form of dots, straight, parallel or zigzag lines, squares, triangles, etc. Neither plants nor animals are represented on any of the utensils found in Santa Helena, though there are some rough specimens of sculpture in the form of clay heads.

The primitive artists who painted the pottery were acquainted with certain coloring matters, it appears that they obtained the red color from oxide of iron, which is found in the vicinity, the yellow was prepared from hydrated iron.

The rough specimens of sculpture, mentioned above, are a few figures or rather clay heads, representing men and animals. The human heads have a great resemblance to the small clay heads found in Mexico, near Cholula. The animals represented are the ignana and procyon, both very abundant everywhere in Central America, and both held in high esteem by the nations on account of their sweet meat.

It is very difficult to come to any conclusion in regard to the people who dwelt on the shores of Santa Helena Bay. A few inhabitants living in the vicinity of these Kitchen Middens, know only that the heaps were abandoned long ago before the Spanish Conquest.

That the debris are old is sure enough, the thick accumulation of layers shows it plainly, but how long they have been abandoned it is impossible to ascertain. The remains of cooking utensils blackened by fire, and the ashes show only, that the tribes who formed the Kitchen Middens lived under the shelter of tents, and practised hunting and fishing, eating their spoils on the spot, just like the other hunters of the stone age.

M. Lopatecki.

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*FRESH-WATER SPONGES FROM MEXICO.**

Meyenia plumosa, Carter, var. Palmeri, n. v.

Sponge (as seen in a dry state) dark brown, massive, attached to and surrounding the dependent branches of small trees, whose stems are flooded by the spring freshets. Texture very loose, and when dry so brittle that the dermal surface cannot be satisfactorily examined; (The impression conveyed by the interior appearance of this sponge is that it is made up of an infinite number of radiating confluent branches.)

Gemmulæ large, numerous througout the deeper portions of the sponge; subspherical or ovoid, surrounded by long birotulates imbedded in a granular crust.

Skeleton spicules straight or slightly curved, mainly cylindrical but gradually sharp-pointed, sparcely microspined.

Dermal spicules irregularly stellate as in the typical species, but in the specimens examined much fewer in number. They vary from simply acerates with one or more long divergent branches to beautiful radiate spherical bodies whose rays are nearly equal, spined, and capitate by reason of recurved spines at their extremities. Another form of spicule, probably also dermal, of which several are seen upon nearly every slide prepared for microscopic examination. is very difficult of description. It may be said to be composed of an irregular series of smooth curved rays arising from a nearly common center, and is somewhat suggestive of a hedgehog or Scotch terrier.

Birotulate spicules pertaining to the gemmulæ, in length about three times the diameter of the supported rotules; shafts cylindrical, plentifully spined: spines long, conical. Outer surface of rotules convex. margin lacinulates; ends of incomplete rays obtuse, recurved. Sponge masses subspherical, reaching five or six in diameter.

This sponge, collected by Dr. Edward Palmer along the banks of the Colorado River, near Lerdo, Sonora, in Northwestern Mexico, about 59 miles SSW. from Fort Yuma, California, is a valuable addition to the sponge fauna of this continent, and interesting from the fact that the typical species, M. plumosa of Carter, has heretofore only been found in his original locality, the rock water-tanks of Bombay, East Indies. That it should skip a whole

* From Proc, U. S. Nat. 2 Miss., 1883, page 587

hemisphere and only be found the second time at its own antipodes is indeed remarkable.

The lower reaches of the Colorado of the West extend for miles through a region described by the collector as 'the hottest, driest, and most barren in the United States,' whose 'vegetation consists of mesquit, cacti, and the screw-bean, Strombocarpus pubescens.' Its normal border lands are known as the 'first' and 'second' 'bottoms,' of which the latter is the higher and of course more distant from the channel. By the frequent changes in its bed however. the river cuts through these, and. washing away the one and filling up the other, reverses their physical conditions. Upon the 'second bottoms,' then, said to be only reached to any considerable depth by the annual floods occurring during parts of May and June, and not to continue flooded more than six weeks at a time, the screw-bean abounds. It is described as a small tree of the general appearance of a peach tree, but with more slender drooping branches. More or less of an alkaline deposit whitens the ground upon which they grow, and the approaching traveler is puzzled to see in strong contrast with it hundreds or even thousands of dark masses, 'like wasp's nests,' suspended two or three feet above.

It was this conundrum that confronted Dr. Palmer during his recent visit, and the answer we have in the sponge before us. From the Amazon River in the tropics to the waters of Maine and Nova Scotia in the temperate regions of the north, sponges have long been known to affect the pendent branches of stream-bordering bushes; but it is unlikely that they have ever before been observed in such quantities suspended for nine or ten months of the year over land parched and desolate.

On referring to the earlier descriptions of his discoveries by H. J. Carter, Esq., F. R. S., we find that though he collected this species on two or more occasions, the fragments were always found detached from their place of growth and floating upon the surface in the water-tanks referred to, about one month after the rainy season had commenced. He believed that the vitality of the gemmules was preserved during the dry season, notwithstanding their exposure to the sun and dessicating winds, and that their germination after the water had again reached them was followed by a very rapid growth of new sponge. This would seem to have been the case also with the present variety, as, according to the reports of the collector, the masses could not have been submerged for a greater period than six weeks in any one year. Whether the whole bulk as now seen was attained during a single season, or is the cumulative result of several annual growths of the persistent masses, cannot now be determined.

It is worthy of notice that M. plumosa and this variety Palmeri, differ from all other known fresh-water sponges by the presence

in them of a compound or substellate dermal spicule. The spiculæ of the dermis throughout the group are generally minute, spined acerates; in M. Everetti, Mills, we find them as minute birotulates. In *this* species the two forms seem to be combined; the spines have become central and prolonged, while their capitate extremities suggest the rotules of the last-named species.

Of the six sponge masses from the above locality, sent by the Smithsonian Institution for examination, the smallest was somewhat fusiform in shape and proved to belong to a different species—Meyenia crateriforma, Potts—heretofore found along the eastern border of the United States. In it alone the mass was not darkened by the presence of some pervading vegetable parasite.

Edward Potts.

PERIDOTITE.

Mr. George F. Kunz, of Tiffany & Co., New York, was sent, accompanied by Mr. J. S. Diller, of the U. S. Geological Survey, to examine the peridotite of Elliot Co., Kentucky.

The occurence there of carbonaceous shale in it, closely resembles the same rock at the South African Diamond Fields, and although diamonds were not found yet, valuable observations were made on this most interesting occurrence, which will be published later by the "Survey," in a paper on the subject.

NEW YORK, June 23, 1887.

THE KANSAS SOCIETY OF NATURAL HISTORY.

EDITOR WEST AMERICAN SCIENTIST:—I beg to call your attention to the late organization in Leavenworth of the Kansas Society of Natural History, which has begun its career with the following persons as officers for the following year:

Dr. R. J. Brown, President; W. R. Lighton, Secretary and Treasurer.

Article 2 of the Constitution reads: "The object of this society shall be the study and increase of knowledge of the natural sciences with special reference to such as are of economic importance to the state of Kansas" The Constitution provides for a corresponding membership of non-residents of this county, and provision is also made for the occasional publication of "Transactions."

The next regular meeting will be held on July 14th, at which meeting papers will be read on the black rot of the grape, by Dr. Carpenter; on the structure of the eye, by Dr. W. D. Bidwell; on the early use and development of the microscope, by Prof. Wm. Lighton; on some of the common plants of this region, by Dr. Brown; and on the circulation of sap in certain plants, where the natural and regular circulation is interfered with, by W. R. Lighton.

Respectfully,

July 6, 1887. *W. R. Lighton, Secretary.*

THE RISE OF UNIVERSITIES.

By S. S. Laurie, LL. D. Published by J. Fitzgerald, 24 E. 4th St., New York Price, post free, 30 cents. Every educator, and all who take an interest in the history of education will find this work to contain a vast amount of information of the highest importance. That nearly all of the great universities of Europe should have arisen in the deepest darkness of the middle ages is in itself a phenomenon worthy of serious study. Truly the founders of those institutions builded better than they knew, for the universities, indirectly, have been the principal agency for the overthrow of all the principles of science and philosophy that were most prized in mediæval times.

MIGRATION OF DAKOTA BIRDS.

Thinking a few notes on the migration of birds of Dakota would be of interest to your readers, I send the following taken from my note book for 1885.

May 14, Marsh Hawk. May 18, Mallard. May 18, Red Buff Shouldered Black Bird. May 19, Snipe (species unknown). May 21, Gray Geese (flock of 26). May 26, Western Meadow Lark. May 31, Killdeer. May 31, Blue Wing Teal. May 31, White Brants. April 3, Crows. April 6, American Rough Legged Hawk. April 6, Black Throated Sparrow. April 9, Yellow Headed Black Bird. April 21, Purple Martin. April 22, Blue Bird. April 23, Red Shafted Flicker. April 23, Western Robin. April 24, Red Shouldered Hawk April 24, Field Plover. April 26, Sandhill Crane. April 26, Sparrow Hawk. April 27, Bronzed Grakle. May 1, Cowbird. May 11, Spotted Sandpiper. May 12, Bobolink. May 12, Barn Swallow. May 12, Yellow Breasted Chat. May 12, Buff Breasted Sandpiper. May 12, Curlew (species unknown). May 12. American Coot. May 12. Grebe. May 14, Western Kingbird. May 17, Bank Swallow. May 18, Western Night Hawk. May 18. Marsh Wren, long and short bill. May 18, Sora Rail. May 19, Black Throated Vieror.

HURON, DAKOTA. *Chette L. Cheney.*

THE ADVANCE OF SCIENCE.

As the world grows older, and as the generations pass away and their places are taken by the rising generation, science progresses; and the mysteries that puzzled the alchemists of the middle ages are now made clear by new light, shed by the investigations made in the general advance of science.

As we stand and gaze on the ruined structures reared by the ancient art of Babylon, Nineveh and Egypt, we feel an awe inspired by those once mighty structures. But when we pause to think

that the demon was the cause of the erection of these noble monuments of ancient civilization, we can not but rejoice at the more peaceful arts of the present era. The builders of these seem to have been admirers of a grand, massive, and imposing style; and it was not until some centuries later, that the fine and beautiful architecture of the Greeks and Romans made its appearance.

Dew was regarded by the ancients as etherial, and they believed that if a lark's egg were to be filled with it, that at sunrise it would fly off into space. But we are not informed that this interesting experiment was ever performed. The Greeks knew that amber, when rubbed, would attract bits of straw, feathers, etc., and from this remarkable quality it was supposed to possess a soul! From the Greek name for this substance (electron) our word electricity is derived.

As late as the fifteenth century, questions like the following were discussed in France: "How many angels can stand on the point of a needle at the same time?" Such a question at the present time would be regarded as ridiculous in the extreme; yet that and many similar ones were once as earnestly discussed by the best educated men of France, and with as much interest, as the scientists of the present day discuss some newly discovered phenomenon in geology, chemistry, astronomy or other branch of science.

The ancients regarded the stars as gods. There was a god of war, a god of the vine, and so on, every department of art having its special divinity. But the investigations of the modern science prove that many of these stars (the planets) are worlds, and with like diurnal revolutions; while some of them are accompanied by satellites, and it is very probable, also, that some are inhabited. Others of these stars are suns, which, like our own luminary, have their peculiar systems of planets revolving around them. These stars are so very remote from us and each other, that the human mind is totally incapable of comprehending the distance.

Then again, the earth was regarded as an extended plain which rested upon the back of an elephant, that on a tortoise, and that on an immense serpent, and so on indefinitely. But modern science has shown the fallacy of the theory also, and proved that the earth is a globe, suspended in space and revolving around its source of light in an orbit of over 500 billion miles in circumference.

Fossils formed during the different periods that passed in fitting this earth for the habitation of man, were regarded as freaks of nature; and fossil remains were supposed to be the tons of fallen angels! Later, these and similar remains were thought to be the skeletons of a race of giants, supposed to have once inhabited the earth. But as time flew on, the science of geology arose, and has successfully proved these to be the remains of mammoth quadrupeds, which unknown ages ago, roamed over this earth in per-

fect freedom, while huge reptiles, equally terrible, took possession and maintained undisputed sway over the Triasic and Jurasic seas. Fragments of the bones of these huge monsters, and also gems like the amethyst and ruby, were supposed to possess miraculous virtues and great healing properties.

Electricity, as lightning and in other forms, was regarded as being sent out by the gods to manifest their displeasure for some offence. But here again modern science has triumphed, and has made even this powerful element element subservient to its will. And, while we have no proof that the ancients had any superstitious fear of steam, it is certain they knew nothing of its great power. But this too, by the aid of modern genius, man has brought under subjection and caused to labor for his benefit.

Of the art of printing they knew nothing, and it seems strange, too, that they should not; for the Babylonians used a kind of hand stamp in stamping their tablets, bricks and pottery; and the Romans used a ring with a device for stamping seals upon their parchments. But they went no further. This, too, was left for a more modern mind to discover. But let us remember that though, through the investigations and discoveries of modern science, we possess many advantages and of inestimable value. Egypt, Chaldea, Greece and Rome, all contributed in some way to the general advance of science, whether by their errors or by their discoveries, they may each claim a share. As the ages roll on, new discoveries will be made and new facts added to science, which is ever seeking new and important truths to add to its already well filled garner.

But science is still in its youth, and its alphabet is hardly learned. As we turn over the pages of the book of Nature, the mind is bewildered with the magnitude and splendor of the study. But the study is as attractive as vast, and the close observer ever

> Finds tongues in trees, books in the running brooks,
> Sermons in stones, and good in everything.

Chas. D. Pendell.

THE NEW CALIFORNIAN POA.

By Dr. Geo. Vasey.

Poa Orcuttiana.—Culms cæspitose, about two feet high, radical leaves numerous, narrow, flaccid, about six inches long, scabrous; culm leaves two to four inches long, attenuate at the apex, and with the sheaths scabrous, upper sheath very long; ligule membranaceous, about two lines long, acute, becoming lacerate; nodes smooth; panicle four to six inches long, lax, the branches erect and somewhat appressed, the lower in threes, one to three inches long, the lower third or more naked, numerously flowered above; spikelets mostly very short-pedicelled, five to nine flowered, four to six lines long; empty glumes nearly equal, one and

a half lines long, the upper three nerved, lower one nerved, scarious margined; flowering glumes oblong, obtusish, flattish on the back, scabrous, about two lines long, scarious tipped, slightly pubescent below, five nerved; palet as long as its glume, acute, ciliate scabrous on the keels.

First collected by C. R. Orcutt near San Diego in 1884, and subsequently by Mr. Lorenzo Jared in Santa Barbara county, Cal. The mature spikelets have the appearance of Glyceria. Its narrow, scabrous leaves and sheaths are good, distinctive characters.

NOTES ON THE COMMON CROW.

Although this species breeds in this locality in large numbers, their eggs are hard to get, owing to the tall trees in which they build, ranging in height from thirty to fifty or seventy and even one hundred feet.

April 9th, I took a set of six eggs from a nest in a large chestnut tree, 44 feet from the ground. This was my earliest find, but a young collector of this place took a set of four on March 31st, and another of six on April 5th.

April 10th, I found a set of five eggs in a black oak, over 45 feet up, different from any I had before seen. No two of these were alike; one was heavily blotched at the larger end with dark brown, purple and lilac; the blue background of another was spotted with a few black spots at the base of the egg.

This afternoon I went to the Valley Forge hills, which might be called the crow's paradise, as the heavily wooded hills afford an excellent breeding place for them. The first nest I found was in a white oak, a few feet below the redoubt thrown up by the Patriots over a hundred years ago. In the course of the afternoon I found three sets of 3, 5 and 6 eggs respectively. One nest was lined almost entirely with wool. *F. L. Burns.*

BERWIN, PA.

WASHINGTONIA ROBUSTA.

Noticing fresh seed of this mythical palm offered in the catalogues of San Francisco seedsmen lately, I at once wrote to a well known collector and dealer, and much to my surprise, received the following letter with samples of the seeds:

SAN FRANCISCO, July 25, 1887.

Washingtonia robusta is a palm similar to W. filifera. The seeds are very similar, but the growth is more robust and the species is in every respect more desirable. The leaf stems are yellowish, beautifully arched, well set with large yellow thorns. It grows about 70 miles south east of San Bernardino, on the slope of a mountain quite high up, and this is the only group, as far as I know, on the coast. *F. A. Miller.*

This information would seem to put us in the way of satisfactorily settiing the question of whether it is a good species or only a variety of W. filifera. No material difference can be discerned between the seeds received as being of W. robusta, and those collected by W. G. Wright, in San Bernardino, and myself in Lower California, from trees which we considered as belonging to W. filifera. F. Stephens, the ornithologist, has recently called my attention to an apparent difference in the inflorescence of the San Bernardino and the Lower Californian palms, but the lack of material prevents any statements being made at the present time.

Washingtonia robusta, as we have before intimated, will doubtless prove merely a well marked variety of W. filifera.

EDITOR.

FRAIL ANIMAL LIFE.

One summer day I took a few eggs of the common 'horn-pout,' or 'cat-fish '(P. atrarius), from under a board in the creek and put them in a small dish of water. They had probably just been deposited there, as there was a fish with them. Each egg consisted of a small yellow part, surrounded by a semi-transparent part of a whitish color; in a short time a small white spot made its appearance in the centre of the yellow part. It grew larger and soon two eyes began to develop in the white spot, and later a small stream of blood began to pass from the lower part, upward, toward the eyes and passing, drop by drop, disappeared under the now large, head-shaped portion that contained the eyes. This white part, gradually assuming a darker color, began to protrude and shape itself more and more until it extended some distance from the yellow part. While the head was thus growing, a tail was making its appearance, and extending in an opposite direction from the head. The egg was now growing smaller while the fish rapidly increased in size. The blood in the small artery was now flowing along the back and disappearing in the head; it was truly wonderful to see this small stream of bright red blood going on its way, drop by drop, without any visable cause.

The fish (or egg) soon began to show signs of active life, wrigling and trying to move itself and its burden of egg food. The white, semi-transparent part was now rapidly absorbed, and the fish grew with astonishing rapidity, and could soon move about by jerks. It would make a great effort and move several times its length when it would remain quiet for some time. No fins had as yet appeared, and it still carried a yellow sack about as large as itself. It was just learning to swim when the dish was upset and observations brought to an end, much after the manner of a chapter in a continued story. *J. O. Snyder.*

CACTUSES OF SOUTHERN CALIFORNIA.

EDITOR WEST AMERICAN SCIENTIST:—Please inform me how many varieties of cactuses are indigenous to San Diego County. The particular locality of each kind, general characteristics, time of blooming etc., would no doubt be acceptable to a few of your readers, both in this county and elsewhere.

SAN DIEGO, July 26th. *L. M. Ford.*

The vicinity of San Diego furnishes us with a beautiful Mamillaria (M. Goodridgü.) which bears a green-white flower in April or May, followed by a club-shaped scarlet berry. This berry is edible, having the flavor peculiar to the wild wood strawberries of the east. From this characteristic, it is sometimes spoken of as the strawberry cactus, but is more frequently called the fish-hook cactus from the fact of central spine being curved.

A very variable cactus, commonly called the Turk's head or turban cactus, is Nuttall's Echinocactus viridescens, abundant on our mesas and near the seashore. The common name sufficiently distinguishes the species in this brief sketch.

The prickly pear, Opuntia occidentalis, also needs no description. The Tuna cactus is a native of Old Mexico.

Two kinds of chollas, one, (Opuntia serpentina,) is low and trailing, a few feet high, with yellow flowers and a dry large-seeded fruit, while the other, (O. prolifera,) bears a red flower, producing a green pulpy fruit, which in turn bears other flowers and fruit, from the peculiarity receiving the name *prolifera*. This last is the common cholla, (pronounced sho-yáh,) that forms such formidable thickets in the neighborhood, and from the abundance of which one of our valleys received its name. The fruit very rarely contains any seed.

Another Mamillaria or two, two or more Echinocactuses, several Opuntias—both chollas and flat-stemed kinds, and a fine cushion cactus, Cereus Engelmanni, are found on the east slope of the mountains of this county, and along the desert border, but it is impossible to say what number of varieties actually exist within our boundaries.

A very pretty Cereus, named for Major Emory of the Mexican boundary survey, is found near the ocean beach around the monument between the United States and Mexico, which resembles a cholla somewhat, the numerous fine spines of a yellow or straw-colored tint.

The giant Cereus, and various other cactuses, are found along the Colorado river and in the neighboring desert.

Dr. Engelmann's great posthumous work on the cactuses of America, will appear in quarto form in about six months, embellished with numerous plates, when we may hope to have further light upon this difficult family of plants, but even then our loss will be great in that his hand could not revise and give the finishing touches to the result of a long life-time of careful observation.

EDITOR.

THE NIGHT-BLOOMING CEREUS.

The night-blooming cereus belongs to the cactus family and, like many of its relatives, it is somewhat uncouth and straggling in appearance. Properly speaking, a cactus has no leaves, the parts usually called by that name being in reality only flattened branches. It will, however, be more convenient and intelligible to use the common term in describing the plant.

The leaves of the night-blooming cereus are about three inches wide and vary in length from six to twelve or fourteen inches.

They are thick and leathery to the touch and have a single central rib. The green part of the leaves sometimes become worn away, especially near the ground, leaving only these central ribs or stalks. The leaves are deeply notched, and in these notches the flower and leaf-buds appear. The resemblance between the two seems perfect, but a magnifying glass shows that the leaf-buds have scolloped edges, while a flower-bud shows a single, tiny point. After a few days' growth, a difference can be detected in the rootlets or fibres, traceable below the buds in the leaf from which they start. A leaf-bud has a single root—if that term can be properly used in this connection— while a flower bud has two or three.

Six or eight weeks are usually required to bring the buds to perfection, but the growth is so much modified by the temperature, the degree of moisture and other conditions that no positive rule can be given. The progress is for some time very slow, but during the last fortnight it is surprisingly rapid. The first growth is by a gradual elongation of the stem, but, at the end of three or four weeks, the changes in the bud itself become daily more perceptible. The long, pink divisions of the calyx can no longer entirely hide the greenish-white corolla, and the whole forms a tightly-twisted, cone-shaped bud which gradually increases in size and length. The flower-stem grows in a straight line from the parent leaf until six or eight inches long, when it slowly curves upward, bringing the bud into a nearly vertical position. When this occurs, the blooming is likely to follow in two or three days. On the morning of the last day; a careful observer can see that the petals have slightly parted at the point, and this opening widens a very little during the day.

The opening of a cereus bud is a sight to be long remembered by any one who is fortunate enough to see it. Frequently the bud begins to open late in the evening, but on the only plant that I have had the pleasure of watching, the blooming began at six o'clock. Slowly the petals separated, shaping the flower at first in a form that suggested a half-opened pond-lilly. As the opening widened, the white, filmy pistil became visible and, farther in, a crowd of fine, yellow-tufted stamens. The pistil reaches the entire length of the flower-stalk and can be drawn out when the blossom withers. It does not stand erect in the center of the flower, but lies with the stamens pressed against the lower edge of the corolla. When the opening has once begun, every moment brings new and beautiful changes, and it is no exageration to say that one can *see* the flower open. More than once, some one was fortunate enough to be looking at the moment when a petal drew back with a visible movement Slowly the pink calyx folds back or curls away from the pure, transluscent, white corolla which takes a more and more beautiful shape as time passes.

The flower seems a heavy weight for the thick stem, and the lovely blossom sways slightly with a motion that seems voluntary. The fragrance is not noticed until the flower is nearly half-opened, but then it grows constantly more powerful. It resembles the perfume of tuberoses, but it is more delicate and subtle. If two or more buds open in the evening and the room is small and crowded, the fragrance is oppressively sweet. At midnight or earlier the process is completed, the corolla curls back as the calyx did some hours before, the stalk partially breaks and the lovely flower hangs withered and drooping. The next morning, the petals have turned back again and the blossom looks like an enormous withered water-lily. If the blossom is cut before it begins to droop, it can be kept several hours on ice, but care has to be exercised in thus preserving it, for the perfume will cling persistently to the vessel in which it is placed.

The plant can be raised from a single leaf and usually begins to bear flowers after three years' growth. After that time, the buds appear each year. The beauty of the flowers repays the waiting, and the plant can be raised without greater expenditure of time and labor than most house plants require.—*Annie J. Handy, in Good Cheer.*

We take the above pleasing description of the opening of a night-blooming Cereus blossom, belonging to the same variety evidently watched by a large company at J. H. Orcutt's Chollas valley nursery. We judge the name of this variety to be Phyllocactus latifrons, the flowers measuring from seven to ten inches across, the petals of a delicate creamy white, the sepals and tube tinged with pink, while the stamens, about 200 in number, are arranged in a peculiar manner. We are told of large plants bearing hundreds of these blossoms in a single night in the Sandwich Islands and in Mexico, and the beauty of such a profusion can be imagined. A magnificent red-flowered species has been reported as found in Mexico.

We present our readers with a picture of the true night-blooming Cereus, the famous Cereus grandiflorus, which it will be observed, differs from the above description. The illustration is of a two-year-old plant grown in a six-inch pot from a three-inch cutting, which shows how easily it is propogated. Instead of flat stems as in the preceeding, this has round stems with a number of parallel ribs armed with clusters of spines, which are not troublesome however. The stamens in this, a true Cereus, are arranged in a regular manner around the pistil, as shown in the picture, which is not the case in the Phyllocactus night-bloomer.

The flowers of either may be preserved in large glass jars filled with alcohol and water for a very long time, preserving perfectly their great beauty as well as their exquisite perfume.

EDITOR.

BRIEF ARTICLES.

ORIGIN OF THE DANUBE.—A French geographer, Mons. De Wogan, has made the surprising intimation that the true source of the Danube is not yet generally known. He has found by means of a canoe voyage, that the great river is formed by the junction at Donouschingen of two small streams, the Brig or Brigach and the Breg or Bregach. The former rises about a mile from the source of the Nechar, whose waters flow into the Rhine.

EFFECT OF HOT DRINKS.—By direct experiment on human subjects, and the use of a tube for examining the contents of the stomach at intervals, Dr. V. E. Nyeshel, of St. Petersburg, has ascertained that a healthy person may drink three tumblerfuls of hot tea after a meal without perceptibly affecting digestion, but that a greater quantity of hot drink retards the digestive process. No difference could be detected between the rate of digestion of hot and cold food.

NECROLOGY.

Henry Whitall, professor Astromomy at Belvidere Seminary, N. J., died June 4, in London, England, aged 75.

Rev. Roswell Dwight Hitchcock, D. D., LL. D., president of the Union Theological Seminary, died June 16, aged 70.

Rev. Mark Hopkins, D. D., LL. D., born at at Stockbridge, Mass., February 4, 1802, died at Williamstown, Mass., June 17.

Allen Y. Moore, a prominent American microscopist, is dead.

John Sang, a British entomologist, died March 2, at the age of 59 years. He was especially interested in moths, and was an excellent artist

Dr. J. S. Polyakow, a Siberian explorer, of the Zoological Museum of St. Petersburg University, died April 17.

EDITORIAL.

GREAT BRITAIN.—W. P. Collins, 157 Great Portland Street, London, England, becomes the general agent in Great Britain for this magazine. Our subscription price to any foreign country in the postal union is $1.25, equivalent to 5 shillings in English money.

THE HOOSIER NATURALIST.—This excellent low-priced magazine was established some two years ago, and has been largely devoted to birds and taxidermy. The publishers, R. B. Trouslot & Co., of Valparaiso, Indiana, have sold their interests to the editor of the WEST AMERICAN SCIENTIST, with which it will be consolidated. The transfer was made at the close of the second volume of the *Hoosier Naturalist*, ending with the July issue.

ORNITHOLOGY AND OOLOGY.—A department devoted to these branches of natural science, will be conducted for a time by R. B. Trouslot, late editor of the *Hoosier Naturalist*, which has been consolidated with this magazine. We trust this feature will be supported and duly appreciated by our friends, and especially by those who were readers of Mr. Trouslot's *Naturalist.*

LIFE SUBSCRIPTIONS.—The proposition made elsewhere of sending this magazine to any subscriber for life, on payment of ten dollars, will be a novel one to many of our readers. While it is common for societies to have members pay when they choose a sum that shall release them from further payment of dues, few papers have yet adopted the plan. Subscribers must have confidence in the vitality of a paper to accept such an offer, which is to their advantage as well as that of the publisher; some prefer buying their periodicals by the month, or single copy of a newsdealer, others prefer buying a yearly subscription, but many we think would prefer paying for life, if they were assured of the publications vitality.

NEW READERS.—As this will reach many new friends this month—friends secured by the purchase of the good will of a late contemporary, we would bid them welcome and invite their cooperation in the conducting of this magazine: Get up clubs, write us of your work, and remember that each subscriber and reader *owns a share in the* WEST AMERICAN SCIENTIST association, for the advancement and popularization of science.

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NOTES AND NEWS.

Frank Stevens, the ornithologist, will spend the season in Arizona, collecting the manuals of that region for the National Museum.

Fears are entertained that the enthusiastic botanist, C. G. Pringle, will not return from his late trip into Mexico, as no news has been received from him.

A night-blooming Cereus was observed while expanding its wax-like petals by a company of twenty-five or more, on the evening of July 27, at the Chollas valley nursery of J. H. Orcutt.

The Orcutt collection of cactus plants, numbering about five-hundred varieties, and the second or third largest collection in the United States, was lately purchased for planting in a park on Coronado Beach. Inquiries for a similar collection are made by Pasadena parties.

Prof. Oliver Davie, of Columbus, Ohio, has promised to contribute to the WEST AMERICAN SCIENTIST.

Several new names appear as contributors this month. All are cordially invited to contribute.

Note the chances to swap books and specimens and send on your notices.

The American Forestry Congress will hold its annual meeting at Springfield, Illinois, by invitation of the legislature of that state, on September 14, 15, 16, 1887.

Proceedings of scientific societies are crowded out of this issue.

By investigation throughout Italy, Signor P. Bonizzi has found that atmospheric dust collected in exposed localities almost invariably contains spherical magnetic particles, which are rare or altogether wanting in the dust of closed localities.

A German w iter remarks that the compound known as 'Zeiodelite,' discovered by Simon, has not been used so much as its peculiar advantages would seem to suggest. It is prepared by mixing twenty-five to thirty parts of powdered glass with twenty parts of melted sulphur. This may be shaped into any design; and it cools into a stony hardness, resisting boiling water and the strongest acids. It can be united at a heat of 400 degrees.

The physical condition of steel is known to be unsettled for many hours after being rolled. Finally it comes to a state of rest, but any test of its quality before that period arrives is misleading. The manufacturers were aware of this peculiarity before they knew the cause.

Gold was discovered in California in 1848.

The largest crystal of alum ever produced, weighing over eight tons, has been sent to the Edinburgh International Exhibition, from the Manchester and Goole Alum Works.

Germany claims that zinc is found in American dried apples.

A curious phenomenon has just been brought to light by the removal of a lightning rod. To the end of the rod, which had been imbeded in ferruginous earth for about fifteen years, was found attached a lump of iron ore, weighing ninety-six pounds, supposed to have been aggregated by the action of electricity from the surrounding earth.

A petrified log ten feet long and fourteen inches thick was found in Meca, Kansas, recently.

A dictionary giving scientific and technical terms in all languages is projected by Prof. Vilanova, and is endorsed by the International Geological Congress.

Hydrophobia is unknown in Lapland, but Pasteur has just shown that the dogs may be inoculated with the disease.

The flatness of Denmark is something remarkable, a recent geographical discussion having shown that the loftiest mountain of the country is only 535 feet high.

The proportion of colors in eyes in Italy is thus estimated by Prof. Mantegazzi: black eyes, twenty-two per cent; chestnut, sixty-four; blue, eleven, and gray eyes, three per cent.

The diminished cost of production in metal work was illustrated recently by Dr. John Percy, in an address to the British Iron and Steel Institute, by the statement that a gross of steel pens, formerly costing thirty-five dollars, might now be produced for eight cents. The cost of making gold chains has been reduced to an eighth of what it was.

An English inventor claims to save one-third of the time and ten per cent. of loss in the cooking of joints of meat, by thrusting into them metallic conductors to ensure their simultaneous heating throughout, these conductors being copper blades with globular heads of iron. Flesh is a very bad conductor of heat, and without this device the outside of the meat is greatly over-cooked, with much waste of nutritious juices, before the inside is well done.

LITERATURE.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT, VI. 1. Notes on the botany of Santa Cruz Island. 2. A catalogue of the flowering plants and ferns of the Island of Santa Cruz. 3. Three new species, by Edward L. Greene; extract from Bulletin 7, California Academy of Sciences, 42 pp.

This contribution to our botany, by Prof. Greene, is unusually interesting, comprising as it does the results of the author's sojourning on Santa Cruz Island, previous to which only four species of plants were known from that island, while he gives a list of three hundred and twenty-one. About twenty-five of them are old world plants, naturalized in California; forty-eight of them are as yet unknown except from this or other islands off our coast; twenty-eight are peculiar to Santa Cruz itself, while twenty-four were entirely new to the science.

GRASSES OF THE SOUTH.—A report on certain grasses and forage plants for cultivation in the south and southwest, by Dr. Geo. Vasey; Bulletin 3, Dept. of Agriculture, 6 pp., 16 plates, 1887.

A NEW PHILOSOPHY OF THE SUN, by Dr. H. R. Rogers, 27 pp.

NEW GENUS AND SPICES OF POLYDESMIDAE, by Charles H. Bollman; from *Entomol gica Americana*, iii, 45.

FRESH-WATER SPONGES FROM MEXICO; by Edward Potts, from Proc. N. S. Nat. Mus., 1885, p. 587.

NOTES ON NORTH AMERICAN JULIDAE, with descriptions of new species; by Chas. H. Bollman, from Annals of the N. Y. Acad. Sci , IV, 25 44.

WEST COAST PULMONATA, fossil and living; by J. G. Cooper, M. D., extract from Bulletin 7, Cala. Acad. Sci.

ADDITIONS TO THE BIRDS OF VENTURA COUNTY, CAL., by J. G. Cooper, M. D., from the *Auk*, IV, 85-94.

NOUVELLES REMARQUES SUR LES ROSES AMERICAINES; by F. Crepin, extract from Bull. Soc. Roy. de Bot. de Belgique, 1887.

MAVERICK NATIONAL BANK MANUAL, 200 pp., 800. Boston. This statistical book for reference gives an historical sketch of the national debt, chapters on the credit of nations, state and municipal indebtedness, water works bonds banks and banking, railroads, land and agriculture, and on other financial interests of the country, presented in a readable form as well as handy shape for reference.

THE CENTURY FOR AUGUST.

The Century opens with an attractive paper of holiday adventure, having the piquant title of 'Snubbin' Through Jersey,' the object of which is to report the incidents, mishaps, and delights of a unique vacation trip in a canal-boat. This narrative, which is to be continued in the September number, will revive the memory of the Tile Club papers, formerly a prominent feature of this magazine.

A paper of more remote adventure is contributed by General A. W. Greely, who described an episode of the Lady Franklin Bay Expedition, under the title of 'Our Kivigtok,' a kivigtok being, in the language of the explorer, a man who has fled mankind and through a solitary life amid nature's surroundings has acquired a gift of clairvoyance. General Greely's paper records much that is curious and interesting in regard to his experience in the polar regions.

ST. NICHOLAS FOR AUGUST.

The number opens with a beautiful frontispiece, by Mary Hallock Foote, illustrating some bright verses by Edith M. Thomas, entitled 'Invitation to Echo'; and the illustrator turns author a little farther on in a charming sketch of Rocky Mountain life, called 'An Idaho Picnic,' with more pictures in her characteristic style. Another artist tells his own story with pen as well as pencil in this number.—George Wharton Edwards, who writes and draws pictures for 'The Figurehead of the James Starbuck,' a capital sea story told ashore. C F. Holder tells 'How Some Animals Be come Extinct,' with special application to those forms which have disappeared within the history of man.

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VOLUME III. SEPTEMBER, 1887. WHOLE NO. 29.

THE

West ✦ American ✦ Scientist.

A Popular Review and Record for America.
Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - EDITOR.

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THE WEST AMERICAN SCIENTIST.

VOL. III. SEPTEMBER, 1887. NO. 29.

A VISIT TO MOUNT HAMILTON.

We left San Jose by the Mt. Hamilton stage shortly after seven o'clock in the morning, and proceeded across the rich, level fields towards the hills which border the valley on the north-east.

The fertility of the soil, as evidenced by the occasional, heavily fruited orchards, the broad expanse of the valley lands, waiting to be cut up into small farms, and the delightful climate of this region,—all of these seemed to prophecy that this valley will soon attract a great number of new settlers, and be filled with prosperous villages and happy homes.

Arriving at the foot-hills, we began to ascend through thrifty vineyards, whose bright green foliage contrasted finely with the yellow fields which surrounded them. As we passed up the easy grade we met numerous teams heavily laden with bales of new hay, which was being sent down from the fields farther up the hills.

Winding upward, we reached the Grand View House, a rightly named hostelry, standing at an angle of the road fifteen hundred feet above the valley, and commanding a magnificent view of the rich landscape, situated near enough to show all the details of field, road, orchard and stream.

Here our horses were changed, and as we set out again we left the region of the valley, and struck out boldly into the hills.

As we rode on, mile after mile, the constantly changing scene was one of continual interest, but fitted to calm the mind rather then to excite the feelings. The mountain air was pure and salubrious; the sky was becoming clear, for we were getting above the region of fogs; houses were few, and the not very fertile land was chiefly devoted to pasturage. The great oaks of the hills were becoming more numerous, and occasionally the presence of the needle pine with its long blue leaves and great cones showed that we were in higher altitudes.

On the road we passed two large wagons, each loaded with a huge section of the great iron pier on which the largest telescope in the world is to rest. Leaving these teams to slowly creep up the mountain, where their load will remain till the end of time, we hurried along the gentle grade, continually passing places of interest, till we drove up to the stable at Smith Creek, twenty miles

from San Jose, and changed horses for the third or mountain stage of the journey.

Right above us, on the top of a sharp peak, was perched the great Lick Observatory. It seemed in the clear mountain air to be but a little way off, and the actual distance is only two miles, but fully seven miles of road have to be traversed before you reach the summit. The road is so laid out, that there is not one steep place in the whole twenty-seven miles, though to accomplish this result, the turns and returns are so numerous, that in a fog one could never guess toward what point of the compass he was making headway.

But as we worked up the mountain, the great dome kept growing in size and clearness, and as we looked back, the tops of the oak-dotted hills kept sinking lower and lower, till, ere we were hardly aware, we were standing on the very summit, and had entered our names in the visitors' album which rests in the hall of the observatory.

The time was a little past noon, and as we had wisely eaten our lunch on the way, we had two free hours before it was time to start down the mountain.

The top of the peak on which the main building is situated, had to be levelled down some thirty feet, to afford sufficient room for the foundations. The building is a long, one-story structure, very substantially built, and finished in a style of plain elegance. A marble-floored hall runs the whole length of the building upon one side, and from this open various rooms, as the clock-room, the library, the instrument-room, and the office. In the center of the building is a small but beautiful rotunda, lighted from above, and in the walls are niches for statuary.

At the western end of the observatory is a twenty-five foot tower and dome, in which is mounted a twelve inch equatorial telescope. This part of the establishment has been completed for some time, and would be considered an excellent equipment, were it not dwarfed by the mighty work which is now in progress at the other end of the long hall. This is, of course, nothing less than the huge tower and dome in which is to be placed the great telescope, with its thirty-six inch lenses, and its fifty-seven feet focal length.

The massive walls of the circular tower are built of bricks which were moulded and burned near the summit of the mountain. The diameter of this tower is seventy-five feet, and in its center is the massive foundation for the pier on which the great telescope is to rest. Within this foundation, sealed up for all time, rest the mortal remains of the donor, James Lick. Forty-four hundred feet above the valley, beneath the most sky-piercing instrument ever constructed, could he wish for a more renowned resting place, or a more enduring monument?

Around the top of the wall of the tower runs a circular railway, and upon the massive trucks rests the enormous steel dome. It

is now nearly completed, but the staging so obscures the view, that one cannot fully grasp its wonderful proportions. When completed, however, a sight of this immense room and the stupendous instrument for which it was built, will amply repay any one for a very long journey to this distant mountain top.

To avoid the necessity for an observer's chair between thirty and forty feet in height, the whole floor of the observatory is made movable, so that it can be raised or lowered at the observer's will. To this end it is counterprised by four huge weights of five thousand pounds each, and by a system of hydraulic elevators it can be moved up or down by the simple turn of a wheel. By a similar arrangement, the dome can be revolved and the great shutters opened or closed.

Among the most interesting departments of the observatory work, is that pertaining to the time system. The clock-room contains several of the best clocks which can be made, only one of which, however, is set to beat standard time. But this one has a most important duty to perform, for its ticks are conveyed down the telegraph wire to San Jose, and from that city they spread on through the whole system of wires as far as Ogden. Just before noon, operators all over the Pacific Slope pause for a few minutes from their accustomed work, and listen to the measured click of their instruments as they mark the swinging of that one pendulum, far away on Mt. Hamilton, and as it comes to the last second of the forenoon, a given signal is sent, which is heard at the same instant from the Rockies to the Pacific.

Among the many instruments to be seen in the various parts of the building, is one for recording the time, direction, and intensity of earthquake waves; four earthquakes have already been observed. Various devices are also seen for recording meteorological phenomena, such as the height of the barometer, the velocity of the wind, and the fall of rains. Outside of the main building are the transit-room, the photographic's-room, and other adjuncts of the observatory.

After the apparatus had been explained by the obliging astronomer in charge, Prof. Keeler, and we had looked at Venus and Arcturus through the twelve-inch glass, we started down the mountain. At Smith Creek we passed a camp of students belonging to the University of California, who were engaged in finding the exact elevation of the great observatory above the level of the sea.

The whole ride down the mountain is full of interest, and one feels on his return to the valley the small sum of three dollars was never spent in a more satisfactory way than in paying for the round trip up and down Mt. Hamilton. The mountain drive and the beautiful and inspiring scenery, amply repay one for the journey, while an inspection of the Lick Observatory at the summit gives the day a charm which will never be forgotten. If the rare

pleasure which the trip affords were well known, the opportunity to enjoy it would not be missed for any slight reason by our settled residents, or by the transient visitor to our coast.

Josiah Keep.

August 10, 1887.

FOSSIL BOTANY.

BY DR. LORENZO G. YATES.

Fossil Botany is a subject of great importance to all who are interested in the ancient history of our planet.

To the geologist who, from the study of the fossil vegetation, its condition, situation and surroundings is enabled to describe the orographic geography of a region, illustrating to him the character of the soil, and the waters flowing in and through it furnishes the principal and only reliable aid in the determination of the geological age of the rocks in which the remains are found imbedded; together with many other important facts necessary to the proper reading of the "testimony of the rocks."

To the botanist and horticulturist, it is, or should be of special interest, showing as it does, the progress of the evolution and succession of plant life during the earlier ages of the world, and enabling him to read a history which nature has compiled, and written for the instruction of its students.

While human chronicles are not only insignificant as compared with the time covered by geological evidences, they are also imperfect and erroneous; nature's chronicles may be fragmentary, but they have the merit of accuracy.

Any person who has looked through the large end of a telescope will have a vivid recollection of the appearance of objects seen with the instrument so reversed; things which are comparatively near to the observer, will appear to be distant, but will have a peculiarly distinct outline, and the same clearness is apparent in distant objects seen through the same medium. So it is with geology and its allied sciences; the student may, by reversing the geological or historical telescope see and read clearly, the history of plant life down the long vista of past ages. The fossil remains of plants and animals which lived in unknown numbers of ages past, defined and well preserved as those of the least remote period.

He may first feast his imagination upon the beauty and luxuriance of the Pliocene forests, as the least remote, and most nearly resembling those of the present age.

Having studied out the fragments of wood and leaves of trees, we place them in their several positions in the scale of plant life, finding among them undoubted remnants of magnificent palms, those noble children of the earth and sun. The eucalyptus, which we were supposed to have first introduced into California from the

southern hemisphere; the cinnamon, fig, magnolia, diospyros and many other trees and plants now restricted to tropical and semi-tropical countries, intermingled with extinct species of sycamore, oak, walnut, elm, ash, pine and other genera now represented by other and corresponding forms. We are now tempted to inquire, what changes have taken place in the animal life of the region? and if we carefully carry out the line of study, to which the question points, we will be enabled to see the former denizens of the forests and streams, in all their wondrous forms and huge dimensions. showing, like the vegetation, a curious admixture of genera and forms of animals now found living in different climates and widely separated countries.

We may view, with perfect safety, the terrific combats between the mammoth and mailed rhinoceros; the stealthy advance of the imperial tiger (Felis imperialis) equal in size, and doubtless no less ferocious than its royal namesake of Bengal; the llama, standing eighteen feet high, whose diminutive representative, about the size of a deer, is now doing service as a beast of burden in the Andes of South America; the three-toed horse, well adapted to feed around the marshes enfringing the islands and peninsulas composing a great portion of the lands of the period, in what is now Central California; the deer, the hog, and non-descripts which were neither hog, horse, ox nor deer, but combined characteristics of several now widely separated families.

The writer has found nearly all the above named animals in the later tertiary deposits of Central and Northern California, discovering new and previously unknown species of mastodon, llama, tiger, wolf, &c., and has portions of their fossil remains in his collection.

These and many other forms of animals roamed the plains and table lands, browsed upon and fed under the shade of trees, whose silicified fragments are now found scattered over the plains, or imbedded in drifts and gravel deposits, or in the "Blue Gravel" of the "Dead Rivers" of the Pacific Coast.

SANTA BARBARA, CAL., August 10, 1887.

TO BE CONTINUED.

THE FERNS OF JAMAICA.

BY DR. LORENZO G. YATES.

Jamaica, the Xaymaca or land of wood and water, of the aborigines, is the largest island of the British West Indies, lying between the Caribbean Sea and the Gulf of Mexico, between 17° 40′ and 18° 50′ north latitude; its area is variously estimated from 3,250 square miles according to the Government Survey, up to 6,400 square miles, the first figures being, probably, the most reliable.

Its surface is mountainous, and presents picturesque and varied scenery, with corresponding climate variations.

The Blue Mountains, in the central portion of the island, attain to an elevation of 7,000 feet, flanked on all sides by hills and mountain ridges, which, rising from the level of the sea, form supports or buttresses to the main range, divides the surface into a large number of water sheds.

More than one hundred rivers and large streams, with their innumerable tributaries, carry off the water of the abundant rains, through deep and narrow gorges, fertile valleys, and level plains to the sea.

This favorable conformation of surface, with the great humidity of the atmosphere, and the general equability of the climate, combine to make the island the richest and most prolific fern region in the world, with other plant growth in corresponding profusion.

In this small area, about the size of the State of Connecticut, nearly five hundred species of ferns, (about one sixth of all the known species of the world) have been discovered.

In the whole continent of North America, from the Arctic Regions to the southern boundary of the United States, comprising an area of a little over eight millions of square miles, less than one-half as many species of ferns are found; and of these, only forty are found in common in the two regions

In 1838, Heward collected seventy-seven species of ferns in Jamaica.

Grisebach, in his "Flora of the British West Indies," enumerates three hundred and ten species, including Lycopodiums, Selaginellas and other fern allies.

Up to April, 188-, Mr. G. S. Jenman, formerly superintendent of the Botanic Gardens of Jamaica, who is making a special study of the ferns of the West Indies, had identified and described four hundred and sixty-five species and sixty-three varieties of true ferns inhabiting Jamaica, and new species are still being dis covered

What a magnificent country for the lovers of the most beautiful and fascinating division of the Vegetable Kingdom! Is it any wonder that, as Lady Brassey quotes in her book entitled "The Trades, The Tropics, and The Roaring Forties:"—There is a saying among military men to the effect that:—"The first year you are quartered in Jamaica you admire the scenery; the second year you collect ferns; the third year you go mad." But it is probably a very mild species of madness, as we seldem hear of any ill effects resulting from it.

R. B. Trouslet's editorial was received too late for this issue. Much other valuable matter is crowded out. W. R. Lighton is to conduct a department in the magazine, and will also have something to say later.

ROSEATE SPOONBILL.

This beautiful bird is very rare in this section, Jefferson County, Texas. It is only found in the wildest and most uninhabited marshes. A few, however, are to be found in such places in most of Southeast Texas and Southwest Louisiana.

We saw the Spoonbill for the first time on April 26th, 1885. We were then in Southwestern Louisiana. We had ascended about 40 miles, a small stream of water called "Black Bayou." This stream flows through a low, flat county, and along the more than fifty miles of its meandering there is not a house, save a few "shanties" near its mouth. The day of the 23d, we had spent in sailing up this stream. Acre after acre of this low, flat land spread out, as far as the eye could reach, on both sides of the "Bayou," destitute of a single human inhabitant or human domicile. In such a lonely place we camped on that night. The next morning, as we awoke, a most beautiful sight presented itself. The sun was just rising, and as it appeared over the tall green cane, which was nodding silently to a gentle breeze, it was beautiful beyond description. As we were standing admiring these beauties of nature, our eyes fell upon an island in this sea of cane, which was covered with, what seemed to be, large red and white flowers, of many varied hues. On closer examination, these flowers proved themselves to be birds which as yet had not left their roost. As these were about a half mile distant, across a muddy marsh covered with an impenetrable growth of cane, we could not go over land to them.

Judging from our knowledge of the county, that the birds were in trees, near the bank of some small "bayou," tributary to the main "Bayou," we set out in search of such a stream. After several hours work we reached the "roost." It was about 9 o'clock A. M., and as yet the birds were resting quietly. When we were within a few hundred yards of them, they flew from the trees and circled around until they reached a great height, and then flew away. Their color, bill and squeaking of the wings, told us that they must be the roseate spoonbill. These birds did not return to their "roost" during the entire day. Making sure that they would return later in the evening, and being determined to secure specimens, we stationed ourselves near the "roost," about an hour before sun-down, and waited patiently for them to return. It was late in the night before we returned to our boat, fully convinced that the "roost" had been abandoned.

What was our surprise the next morning on rising, to find that the spoonbills had returned and were occupying their old "roost" again. We again tried to secure specimens of these birds, but met with the same success as had greeted us the day before.

We remained several days in that locality, and made repeated efforts to secure specimens, but were compelled to return home without a single spoonbill.

We visited this locality again the latter part of July, of the same year, ('85), and found a spoonbill's nest containing three half-grown birds. As the adult birds were in poor plumage, we secured only a few specimens, but determined that the next year we would be in time for both birds and eggs.

In the early spring of '86, we visited this locality several times, and watched the spoonbill very closely. In May we noticed them carrying sticks, and found where a small "rookery" was being built. On the second day of June, we visited it and were successful in taking several sets of eggs. The "rookery" was in a small clump of Cypress trees. The nests varied in height from the ground, from 5 to 15 feet, and resembled very much a heron's nest, being more "bulky" however, and made of green, instead of dead sticks. The eggs were ashy white, spotted with reddish brown, varying much in shape and size. Average size 2.50x1.80. The usual number of eggs found in a nest was 3 and 4. We took from one nest, however, 7 eggs, all perfectly fresh. From several nests we took as many as 5 and 6 eggs. In this same "rookery" were nesting, the American egrett, La. heron and snake bird.

We secured several specimens of the spoonbill this time, and they were in beautiful plumage. As we examine these specimens, we cannot help but remember how they looked while alive, and are forced to the conclusion that nowhere else do these birds look so beautiful as in their native haunts. There perched in a tree, each movement shows some new color or tint to admire, or flying over head the squeaking of its wings, like some old door on its rusty hinges, causes attention to its swift and graceful flight.

R. E. Hachford & Son.

RED TAILED HAWK.

I found a nest of this species on April 9th, '87. It was in a medium sized oak, and not more than thirty-five feet from the ground. When I first saw the nest, the old hawk was setting. I threw several stones into the tree before I could make her leave.

The nest was not easy to reach, owing to grape vines matted about the body of the tree; but, by using my hatchet freely, I managed to reach the nest, which contained three eggs: white, with bluish tinge, spotted and blotched with brown umber, a few small spots of black, and large splashes of very light brown. On one, the spots formed a ring around one end, and numerous spots over the entire surface; on another, the spots are large and scattered all over the surface, but more thickly at one end; on the third, the spots formed a ring around the middle of the egg, with spots and blurs all over the surface. They measure as follows:—2.40x1.91; 2.48x1.93; and 2.51x1.92 in.

The nest was placed in a fork, and was composed of sticks, twigs, small branches, corn husks, grass and moss, lined with

grass, fine strips of bark, and a few feathers which were probably shed by the bird.

While I was putting the eggs in my collecting box, the parent birds rose high in the air, drew their wings back, and darted at me several times, once just missing my hat.

A farmer had been waiting impatiently for more than a week for the old bird to hatch the eggs, that he might kill the young together with the old ones, and take them away to the "Squire" and get the 50 cents bounty, offered for each hawk and owl scalp. (A poor law.—R. B. F.)

Just imagine how "sad and woe begone" he looked, when next he climbed to the top of the high ledge of rocks where he could see into the nest, to find that his intended victims had hatched (?) and gone. *J. W. Jacobs.*

AN ANTELOPE CHASE.

About the 10th of June we left La Junta, Col., at 7 o'clock in the morning and started northward. Crossing the Arkansas River which runs at the base of this beautiful and thriving city, we soon found ourselves on the elevated prairie lands. As the object of our drive was to look at some government lands, it will not be wholly inconsistent for me to say a few words about the surrounding country.

Lying north of La Junta, and just beyond the Arkansas River, is some of the most beautiful land of Colorado, now open by the government for settlement. This vast region, until recently, has been used by ranchmen for pasture, throughout the entire year. The prairie is level, with occassional undulations, and covered with a thick growth of buffalo grass. It was here, upon this grassy lawn, stretching away beyond the limit of vision, that our chase occurred.

My companion, Mr. Seeley, of La Junta, Mr. Fetterman of Ohio, Mr. Hughes of Kansas, and myself, were driving leisurely along when suddenly our eyes were directed to an object some two hundred yards distant. We advanced various opinions as to what it was, and to settle the dispute, we pulled off from the trail, and with increased speed, drove in the direction of the animal. As it leaped off, we saw it was an antelope, apparently of half growth. Mr. Seeley being anxious for a chase, as well as the fun he could have with us 'tenderfeet', seized the whip and urged the ponies at full speed, after our frightened game. It would have been a very difficult matter for him to have determined which was the most frightened, the innocent antelope or his three companions. But I think on that score we stood about '8 to 7' in favor of the antelope.

To all our urgent appeals to be excused from further pursuit, he only turned a deaf ear, as he urged on the ponies. Expecting

at any moment to be dashed to pieces, or strewn over the prairies, of the west, it is useless to say our minds immediately reverted to home and friends. Regardless of danger he pushed on and soon ran up by the little fellow, when to our surprise, we found him to be not more than six weeks old.

In making a sudden turn for an opposite direction, the little fellow gave way and fell by the side of our carriage. A more piteous and mercy imploring appeal, never came from the lips of man, than was expressed in the bleating of that innocent little creature. As quickly as our team could be checked, three of us sprang from the carriage to bag our game, but were surprised to find it escaping, at no small pace in an opposite direction.

Thus, freed from our danger, Mr Seeley was left to continue the chase alone, while we were delighted to remain as observers. No sooner would Mr. Seeley overtake the little fellow, than it would turn in an opposite direction, and while he was making a gradual turn to prevent upsetting it would get far in advance. This manner of chasing by abrupt turns, was kept up for several miles; and as his strength gradually failed, he was thrown by the artfulness of the driver; into a gradual circle, and being pressed by his pursuer from the outside, his circle became smaller and smaller as his strength departed.

During these miles of chase we could only look on with anxious delight; but at last enclosed in the circle, which had been rounded up to small dimensions, our chase began. His strength almost exhausted and Mr. Hughes being the swiftest on foot, succeeded in capturing the prize. Notwithstanding his almost breathless condition, his bleats for mercy were the most piteous. We had captured a beautiful specimen of the antelope about six weeks old, and considered ourselves amply paid for the chase.

Fortunately for it, as well as our ponies, we had taken several l ottles of water with us in anticipation of our own thirst, which we used to drench it, thus quenching his thirst and moistening his parched lips. Our ponies were treated likewise, and after a few minutes rest, were ready to continue our drive. Our prize was taken into the carriage and carefully nursed by Mr. Hughes through the entire journey. We returned to La Junta about 12 o'clock, and after looking after the welfare of our captive, enjoyed a hearty dinner. Mr. Seeley being the most entitled to the fruits of our chase, was given the prize.

A nurse's bottle was provided, which the little fellow soon learned to use with a relish, and by night it had become quite gentle. We had no means of determining the distance ran, but felt perfectly safe in saying that nothing short of ten miles would cover it. The greatest surprise was that the little fellow ran as long as he did. We left La Junta that night greatly pleased with the chase, leaving the little captive behind.

VALPARAISO, IND. *W. A. Barr.*

THROUGH THE SWAMPS IN AUGUST.

There are many people who argue that the finest wild flowers of the season are found in the spring time, and they are always desirous of scouring the woods and searching hill and vale for the harbingers of spring; the fragrant Trailing Arbutus, Hepaticas, Anemones and the like, that appear as soon as the wintry blasts have died away and the balmy air and gentle zephyrs betoken the coming of spring. Those who have this impression are in a measure correct, but they must not for a moment entertain the idea that when "Old Sol" pours down his hottest rays and when the hot and scorching winds of a mid-summer day blow across the meadows, that there are no wild flowers worthy of notice. Probably one great reason why the mid-summer flowers are so neglected and little thought of, is on account of the usual great heat. The botanist as well as the most casual lover of flowers, is very much interested and becomes very enthusiastic in hunting in the spring time, in cool weather and gentle breezes blowing where everything is fresh and lovely, but as the weeks roll by he becomes tired of the sport, and when the hot months of July and August come, he is ready to drop botany for that year, rather than spend such hot days in the field. We can hardly blame one for these inclinations yet can softly say that if one were to rouse himself, and scour the fields and wander beside the shady brook and along the swamps, he will be well repaid. In direct contrast to the delicate and small plants of spring, we find in August huge hardy plants with generally larger and more gorgeous flowers. A trip by the swamps and wet meadow on an August day, will reveal to the most careless observer, the most conspicuous and handsome of flowers. Let us glance at a few that we would meet on a ramble in the haunts of these fine August bloomers.

Along flowing streams and in swamps, our attention is first caught by the immense, beautifully tinted, roseate flowers of the Hibiscus Moschatus or Swamp Rose Mallow. It will be recognized by its striking resemblance to the Hollyhock; they both belong to the same family. The stalk of the Hibiscus often grows to the height of six feet, and is of itself not at all homely, and the flower is simply gorgeous. One of the finest displays of this plant is found in the Montezuma Marshes in New York State. It is here very abundant and affords a fine spectacle. It is a great wonder that a plant with such handsome flowers is not cultivated, but seemingly no general attempts to domesticate it have been made.

In the haunts of the Rose Mallow is found the splendid Cardinal flower (Lobelia Cardinalis). This is generally more common than the preceding, and is more diffused and less local. It is generally found in low grounds. The plant bears a large spike of handsome, intensely red, showy flowers, rarely varying to rose color

and often white; being a perennial and increasing by off shoots, it is quite easily cultivated and is often found in gardens, where its beauty can be appreciated. To be successful in growing it, it should be transplanted in the fall after it has finished blooming, and placed, with plenty of its native earth, in a very wet spot in the yard or garden, and in the spring it will come up and bloom in profusion. Another handsome Lobelia, found somewhat later, is the great Lobelia, or known to the botanist as the Lobelia syphilitica. This one bears large blue flowers; they also are often found white.

Somewhat of a different type is the Helenium autumale or Sage Weed, a compositer growing to the height of several feet and bearing a showy corymb of yellow flowers. It is very abundant, except, perhaps, in New England. Its drooping rays give it a peculiar appearance It is readily distinguished by its extremely bitter taste.

A rather local and not generally met with plant is the Lythrum Salicaria, commonly known as the Spiked Loosestrife. In most all botanys its location is given as Eastern New England and Orange Co., New York, but this is erroneous as it has a much wider circle of growth. It is found besides in New England in Northern New Jersey, and in many places in New York. Contrary to its being found in only Orange County I have myself observed it in six counties of the state, and it is still spreading, and all along the shores of the Hudson may be seen its tall spike of purple flowers, during July and August. This plant is quite extensively cultivated.

Along streams and in wet ground the Hardhack or Steeple bush Spiræa tomentosa flourishes and lifts high its tall handsome spikes of feathery blossoms; it is often discovered with white flowers. It is commonest in New England, and is one of our handsomest summer wild flowers. Growing with this, but more abundant, is the Spiræa salicifolia familiarly known as the common meadow Lueet. It bears a crowded panicle of flesh colored flowers; it often attains quite a height and becomes a large bush, and its beautiful tints make it desirable for the garden.

One wishing to examine a very curious plant should not fail to observe the Chelone glabra, known under the common names of Turtle Head, Snake Head, Balmony, Shell flower, etc. It blooms from July to September in all wet places and very abundantly, and bears flowers about an inch long, and of a white rose or purple color; its varieties of shades being a particular feature. Its shape is its peculiarity; it resembles greatly the head of some reptile, as a snake or turtle, whence its common name; and its scientific name is from a Greek word, meaning a tortoise. It has long been cultivated, its curiousness being the great incentive that brings it into the garden.

The Gerardia purpurea or purple gerardia, a parasitic plant that haunts wet places especially near the coast, belongs to the same family as the Chelone and exhibits the same general features. It bears very handsome flowers and on account of its great beauty, has been often experimented with, with a view to cultivation, but being a parasite of course all efforts have been in vain. Another handsome flower found with the preceding is the American centaury (Sabatia stellaris). It bears a forked raceme of large star shaped red flowers, and is truly grand.

We find a very common, though not at all handsome, yet very conspicuous flower in the Vernonia Noveboracensis or Iron weed, a tall coarse weed of August; with many purple heads; it is a composite.

Other plants which may be observed in damp spots during the last month of summer are the Verbena Hastata (Vervain) which bears a handsome spike of blue flowers; the Hypericiun mutilum whose cute little yellow star flowers often form a perfect mass in swampy ground, while near at hand the diffuse panicles of small white flowers are borne upon the Water Plaintain (Alisma plantago). The Impatiens fulva, known as Touch-me-not, Balsam and Jewel weed, grows tall and rank everywhere and the Mimulus ringens or monkey flower is also very common. The Peppermint Mentha peperita exhibits a spike of fragrant purple blossoms, and when a full and perfect spike is formed nothing can be prettier.

There are many, many other plants, no less worthy of mention, that may be found at this time, but a sufficient number have been cited to clearly demonstrate to the skeptical that the summer months, August being the case in point, are not wanting in flowers, and that one may collect and observe as many plants, and enjoy a days outing with the summer plants, if he will, as thoroughly as he may in balmy spring. *Geo. E. Briggs.*

CHARLES L. M'KAY.

Prepared for the meeting of the San Diego Society of Natural History, held April 7th, '87.

In the Spring of 1881, Mr. Charles L. McKay was sent to Alaska, by Professor S. F. Baird, of the Smithsonian Institution, to make biological collections, to study the ethnology of that region, and to take charge of a United States Signal Station.

The position appeared to be a most favorable one for a young Naturalist, for, in addition to a good salary his expenses were paid, and materials and books furnished for the expedition; and, what was of more importance, the collections made were to be stored at Washington, until his return at the end of three years, when the collector might describe all the new species secured, and he would be entitled to the first "set" of specimens after the National Museum had been supplied.

Mr. McKay had already made a valuable contribution to the Ichthyology of the United States, having written a monograph of the *Centrarchidæ*, in which one new species was described. He was Museum Assistant to Professor Jordan, and graduated with honors from the State University of Indiana, the year he went to Alaska. Mr. McKay was stationed at the Eskimo village of Nushagak, on the river of that name, fifty miles from Bristol Bay, and near 59° north latitude, 158° west longitude.

A letter from the Agent of the Alaska Commercial Co., brought the sad news to San Francisco, of Mr. McKay's death as follows:

When out collecting in April, 1883, Mr. McKay was drowned. He was alone in a bidarka or canoe, and it was supposed that he tried to beach his canoe on the ice, but not succeeding, the boat was capsized. Other members of the party afterward found his gun, but his body has not been recovered. At the time of his sudden death, Mr. McKay had been in Alaska two years, and in one year more would have been ready to return to civilization. A good house had been built, and it was comfortably furnished and supplied with books for his use, but the only persons in the village who could speak English, were the Fur Company's agent and his assistant, a half-breed Indian.

Mail was brought twice a year by a schooner sent from San Francisco, by the Alaska Commercial Co. Of the short days and long cold winters, Mr. McKay wrote little, but in his letters there are interesting accounts of the country and its inhabitants. He says: "Nushagak is not on the seashore, but is 40 or 50 miles up the river. The rivers in this country are large magnificent bodies of water. In front of the village the river is about four miles wide; the air, however, is so clear here, that it looks to be not a mile to the other shore. Over beyond the opposite shore, apparently a stones' throw, but in reality about twenty miles, is a range of low, rugged, sharp, clear-cut mountains; back of the village stretches the treeless tundra, dotted all over with little fresh water lakes. Timber grows along the river bottoms, but so near the sea-coast as this, none grows back from the rivers. This country has a certain desolate beauty of its own; if the vegetation was only as rich and luxuriant as the States, it would be really a beautiful country. * * * * The Indians here live in little villages along the banks of the rivers, usually where fish are to be had in plenty. They live in barrabaras or sod houses. The simplest form of a sod house is made by driving a few sticks into the ground, putting a few sticks across them for a roof, and covering the whole around and over with about a foot and a half of sods, leaving a hole in the roof for the smoke to escape, and a hole for a door; better barrabaras are made by building a regular log hot and covering it over with sod. The Indians dress almost entirely in skins; their summer suit consists of a squirrel skin cap, a squirrel skin parka, deer skin trowsers and moccasins; for socks they pull a wisp of dry hay

to put in the bottom of their moccasins. The parka or coat, reaches to the knees, and is made large enough in the neck to slip on over the head; when at work they tuck it up out of the way by means of a belt around the waist. When watching the approach of a person, if the weather happens to be a little chilly, the Indians squat down on the ground, draw their parkas in around their feet, pull their arms in out of the sleeves, and present the appearance of a row of superannuated progenitors of the human race. * * * There are just two modes of locomotion in use in this country. In summer time, travel is by water in bidarkas, and in winter, by land or up the frozen rivers with sleds and dogs. I have tried the summer mode pretty thoroughly, and have found it a very pleasant way of traveling. * * * * The Indians in this section live largely on fish. They catch the Silver Salmon which run up the river in myriads; at high tide the men go out in bidarkas along shore, and catch them in nets; the women prepare the fish for drying by cutting off the flesh outside the ribs; it is then hung over poles and left till dry, and after being smoked is ready for winter use. If all the fish cannot be prepared for drying, a hole is dug into which the fish are thrown, covered over and left to mellow for future use. These people can eat anything that comes in their way. On a trip when I was with three of them, they found a young beluga, that had been washed ashore some time, and was more than half rotten; this they cooked and made themselves a delicious meal. *Rosa Smith Eigenmann.*

MARTYRS OF SCIENCE.

The scientific investigator, and notably the experimenting chemist, incurs dangers that would be likely to appall the most valiant fighters, and he meets them calmly and deliberately, not in hot blood and excitement. Familiarity with danger breeds recklessness, if not contempt, and the chemist will coolly taste with the tip of his tongue any unknown liquid that may be handed to him. Prussic acid is about the only thing he will not put into his mouth, but he can recognize that without tasting it. He will make all sorts of chemical combinations, and try them to see if they are explosive or otherwise dangerous, and sometimes he discovers in a very unpleasant way that his new product is loaded. Dulong, in 1811, discovered chloride of nitrogen, and when he recovered consciousness, amid the wreck of all the glassware in his laboratory, he made a note with his unwounded hand, of the fact that chloride of nitrogen is highly explosive. About a year afterward, in trying to ascertain the exact conditions necessary to explode the compound, he lost an eye and two fingers. Davy, in the same year, had a similar adventure with the new explosive. A tube containing a small quantity was suddenly shivered to atoms without any

apparent cause, and a piece of the glass struck Davy in the corner of the right eye, disabling him from further immediate experiments. In July, 1813, Davy set about finding out what was the matter with chloride of nitrogen, and attempted an analysis by mercury. The stuff went off again as usual, but Davy had protected his eyes with a thick plate of glass, and he was wounded only in the head and hands. Faraday was an assistant to Davy at this time. He was holding a small tube containing a few grains of the chloride between his thumb and finger, when a sudden and wholly unprovoked explosion occurred, stunning him and badly tearing his hand.

Pliny, the elder, lost his life by venturing near Vesuvius to investigate the interesting phenomena of the eruption of August, A. D., 79. He was suffocated by the sulphurous fumes. Lehman, professor of chemistry, at the Imperial Museum of St. Petersburg, was killed in 1767 by inhalation of fumes from a strongly-heated arsenical mixture. Berthollet proposed in 1788, to substitute the chloride of potassium for the nitrate in the manufacture of gunpowder, and while experimenting at Essoune, produced a terrible explosion that killed the director of the government works and a young lady. Berthollet and Lavoisier were both present, but escaped injury. Lavoisier was guillotined in 1794. Pelletier, the elder, made a special study of combining phosphorus and chlorine with the metals, and the breathing of the vapors induced consumption, of which he died. In 1808, Barruel rubbed fulminating mercury in an agate mortar and had a portion of his hand blown off. The next year Figuier put sixty grains of the same stuff in a glass-stoppered bottle, and took it into the lecture room at Montpelier. When he removed the stopper, the friction caused an explosion that destroyed one of the chemist's eyes. Thenard was lecturing in 1825, to the chemistry class of the Polytechnic School in Paris, and moistened his throat with two mouthfuls of corrosive sublimate instead of sweetened water. "Gentlemen," he said, "I have poisoned myself; what I have taken is corrosive sublimate, and the remedy is white of eggs. Bring me some eggs." The students raided all the stores and kitchens in the neighborhood, and the professor was supplied with eggs enough to save his life.—*N. Y. Tribune.*

An industrial journal gives the following valuable information: A one-inch shaft running one hundred revolutions per minute will transmit one horse-power; a one-inch shaft will stand the force of fifty pounds at the end of a crank one foot long. A one-inch belt running eight hundred feet per minute will transmit one horse-power. A one-inch wrought iron rod will support seven thousand pounds, and a two-inch rod four times as much.

THE WALKING FERN IN IOWA.

The rare and curious Walking Fern, Camptosorus rhizophyllus has been mentioned by several authors as of Iowan occurrence, and I do not speak of such occurrence now as a novelty, but simply to describe a locality where I have found it in considerable abundance.

This locality is a bit of heavy, rocky woodland, upon the north bank of the Des Moines river, about four or five miles below Ottumwa, in Wapello County. The land is very hilly and rough, and is immediately underlaid by a brown Carboniferous sandstone containing large concretions of iron oxyd, and where the stone has outcropped upon the hillsides, the iron has become disintegrated by the action of the weather, and caused the formation of caves of considerable size in the sandstone.

In the Summer of 1884, I visited the place with geological equipment, intent upon a study of the occurrence of the iron, and in following up a high and narrow ravine cut through the sandstone, suddenly breaking through a heavy growth of underbrush, I found myself at the mouth of one of the caves I have mentioned, and directly in front of the aperture in the bed of the ravine was a large boulder of sandstone covered with a thick growth of moss, and in this moss were seemingly numberless specimens of the Walking Fern.

I should judge that there were fully 150 specimens, and, although diligent search was made, not a single individual could be found in the entire wood but upon this boulder.

This trip was made late in June, and the ferns were just in condition to exhibit all the peculiarities of the species—the long, slender leaves, so unfernlike in appearance, with the delicate filament growing from the tip, bending down and becoming rooted, to grow into other individuals, and the curious arrangement of the spores.

My geological equipment furnished no means for the preservation of ferns, and only a few were gathered, and these were not in the best of condition when I reached home.

In the same month in 1886, some friends visited this same neighborhood on a fishing expedition, and at my instance and direction they made search for this same cave, and secured quite a large number of the specimens, but as they did not reach home for several days, there were but few of these in good condition.

A number were prepared as well as possible, and have since been largely contributed to several Eastern Museums and other Institutions, and I have yet a few remaining, which I should be pleased to place where they will be of value.

W. R. Lighton,

112 South Esplanade, Leavenworth, Kansas.

A MUSEUM OF NATURAL HISTORY.

The Coronado Beach Company has closed a contract with Prof. Henry A. Ward, of Rochester, N. Y., to equip a Museum of Natural History, to be built in one of the parks near the Hotel Del Coronado. The museum building will be 150x50 feet in size, with an annex 20x35 feet. Professor Ward has a world-wide reputation among scientific men, and his name alone will be sufficient to attract attention to the new enterprise. Several years ago he had a collection on exhibition in San Francisco, that was visited by thousands of spectators, and created so much interest that a determined effort was made to retain it in this city. Finally it was purchased by Leland Stanford and Chas. Crocker, and by them presented to the Academy of Sciences. The collection which the Professor will place in the Coronada Museum will exceed in interest the one now in San Francisco.

Professor Ward's specialty is the reproduction of extinct animals such as the mammoth, mastodon and other creatures of prehistoric times. These results of Professor Ward's skill are so graphic that the visitor to the musuem might imagine himself, barring the roaring of the monsters, back in the tertiary period and gazing upon a prehistoric menagerie.

In addition to the museum proper Professor Ward will fit up in the annex to the main a zooptican, similar to the one now at Woodward's Gardens, San Francisco, and which has for years proved an object of delight to visitors, both young and old.

The price contracted to be paid to Professor Ward by the Coronado Beach Company is $28,000. This of course does not include the cost of the building, which will be of wood, but constructed in a tasteful and artistic manner, to correspond with its surroundings.

Professor Ward visited San Diego last spring, and was so pleased with the climate that he has concluded to reside here a portion of the year at least, and will take the museum under his especial care.—*San Diego Sun.*

USE YOUR PENCILS.

In all your studies you will find it of the greatest helpfulness to make drawings of your specimens. I know it to be true that every one can, with a little patience, and even no instruction, draw well enough to make it his while to draw the best he can. Don't say "I can't draw." Don't say you have had no lessons. Simply take a piece of plain smooth paper, and a hard pointed pencil, and draw. Draw each object as it looks to you. When you analyze a flower, make separate drawings of the separate parts—the petals and sepals, stamens and pistils, ovary and ovules, root, stem and leaves and sections of the same. Agassiz used to

say 'The pencil is the best microscope,' which means that when you draw each part as accurately as you can, your attention is so rivited to minute details that you learn with the naked vision to see more than an untrained eye would see with the aid of the most powerful objective.—*President Ballard.*

DR. BALDWIN.

Dr. Baldwin was the botanist of Major Stephen H. Long's expedition to the Rocky Mountains, when it started from Pittsburg in May, 1819. But his health failed and he was left at Franklin, Howard Co., Missouri, where he died August 31, 1819, and the late Dr. Edwin James his took place in the expedition as botanist and geologist.

Dr. James speaks of Dr. Baldwin as having been an earnest and diligent worker and as having contributed much to advance and embellish the fascinating science to which his life was dedicated. His manuscripts were numerous but his published works few. His Herbarium contributed to enrich the works of Pursh and Nuttall; he was the friend and correspondent of Muhlenburg and contributed materials for the catalogue of North American plants published by that botanist. In South America Dr. Baldwin met with Bonpland, the illustrious companion of Humboldt, and corresponded with him until his death. He travelled in South America and North America, and his notes and collections are extensive and numerous.

In a letter addressed to Mr. Frazer, and extract of which was published in the tenth volume of the *London Journal of Literature* and the arts, Dr. Baldwin mentions having discovered, near Monte Video, in South America, the Solanum Tuberosum in its native locality. Mr. Lambert, however, considered this plant as the Solanum Commersoni of Dunal, and though it produces tuberous roots, and in other respects makes a near approach to S. tuberosum; he was not satisfied of their identity, and remarks that it is yet to be proved, that this is the stock from which the common potatoe has been derived. It appears, however, that the original locality of the solanum tuberosum has been ascertained by Ruiz and Pavon, after having escaped the observation of Humboldt and Bonpland.

During Dr. Baldwin's connection with the Rocky Mountain Expedition, after he was unable to walk on shore, he caused plants to be brought to him on the boat during the voyage from Pittsburg to Franklin, and detected and described many new plants. The following is a brief extract from his diary:

Erigeron canadense, Solanum Carolini anum, very luxuriant and still flowering. The leaf of the Tilia glabra, I found to measure thirteen inches in length, and eleven in breadth. Bignonia radicans, a Helianthus with a leaf margined with spines, the nar-

row leaved Brachystemon , and many others in flower. August 4th Dr. Lowry informed me he has seen Pyrus coronaria, forty feet in height in the forests about Franklin. He showed me a Rudbeckia about three feet high with a cone of dark purple flowers probably a new species. A few notes more and his diary was closed to be opened by him no more.

SCIENTIFIC SELECTIONS.

Soft iron has a magnetic power twice that of lodestone and one thousand times that of ferric sulphate.

Astronomical authority fixes the light emitted by all the stars upon the surface of the globe as equal to one-tenth of the light of the full moon.

The fastest time ever made by any ship or boat, according to a scientific journal, was twenty-eight miles per hour, this being the performance of an Italian twin screw torpedo boat.

The sun's gravity is twenty-seven times as great as that of the earth. Were the earth's gravity increased to that of the sun, a one hundred and fifty pound object would weigh about two tons.

Upon analysis as it comes from the gin, cotton-seed contains fifty pounds of nitrogen, twenty pounds of phosphoric acid, and twenty pounds of potash to the ton. Southern corn-fodder contains about twenty pounds of nitrogen and small percentages of phosphoric acid and potash to the ton.

According to a celebrated French astronomer, the total number of stars visible to the average naked eye does not exceed six thousand. An ordinary opera-glass will bring out twenty thousand; a small telescope will bring out nearly two hundred thousand, and the most powerful telescopes one hundred million.

There is no property of steel that is not common to cast iron; as, for instance, the hardening of steel and the chilling of cast iron, and softening either by heat, and from the mildest steel, containing only traces of carbon, to the highest cast iron, we have simply one substance, iron, containing various quantities of alloys or substances in solution, and the properties which we observe vary only in degree, due to the quantity of alloy that is present.

In order to preserve the eyesight, an oculist says that it will be found a good plan to cease using the eyes for the time being, and look away from the work when the sight becomes the least painful, blurred or indistinct, and, after perfect rest for a moment or longer, work may be resumed, to be discontinued as before when the eyes again feel fatigued. The light should always be sufficient and fall properly on the work, it being best to have it fall from above and behind, or, failing this, it may fall from the side. Any artificial light for the evening is good if it is brilliant enough and

steady, but when such light is at all painful it is safer to read or write only during the day. Reading in the horse or steam cars, requires too great an exertion of the accommodative power to keep the eyes fixed on the letters. The accommodative power is also too much taxed by reading when lying down.

LITERATURE.

Pittonia: A series of botanical papers, by E. L. Greene, part 2, is at hand. The author explains that the name is in honor of the great French botanist, the family name of Tournefort. A botanical sketch of San Miguel island, with a catalogue of the flowering plants, is an interesting feature of this issue.

A revision of North American Linaceae, by Prof. Wm. Grelease, from the Trans. St Louis Acad. Sci., V., 7-20, from the author, is a valuable contribution to our botany.

Vegetable Parasites and Evolution, is the title of an address by Prof. W. G. Farlow, before the section of biology, A. A. A. S., August, 1887.

Dr. Geo. Vasey has issued Bull. No. 4, botanical division of the Dept. Agriculture, giving the desiderata of the National Herbarium fo North America, north of Mexico, from Ranunculaeeœ to Rosacræl inclusive, including nearly 700 plants of which specimens are wanted.

A report on experiments on the cottony cushion-scale and the red-scale, by Albert Koebele, 1887, has been received from the author.

Bibliographical contributions, No. 25, consists of a list of works on North American fungi, by W. G. Farlow and Wm. Trelease. It is issued by the Library of Harvard University, Cambridge, Mass., 1887.

Ornithological Observations in San Diego County, by W. O. Emerson, is the title of a valuable paper on our birds in Bull. 7, Cal. Acad. Sci., 419-431, for which we are indebted to the author. The observations were mainly made in the Volcano Mountains and in Poway Valley.

An account of the importations and exportations of horticultural products for 1884 to 1886, by Ch. Joly, Paris, 1887, is a valuable pamphlet of 9 pages, showing the extent of the trade in France and the distribution of her products in foreign countries.

Dr. C. C. Parry gives a partial revision of the Uva-ursi section of the genus Arctostaphylos, as represented on the Pacific Coast, in Bull. 8, Cal. Acad. Sci., 483-496. He seems to favor the re-establishment of Nuttall's Xylococcus (X. bicolor). A. pungens and A. glauca he treats as extra-limital (Mexican) species, the California plants hitherto known under these names receiving

treatment as new species, as are also several forms previously confounded.

A list of our manzanitas would be as follows:

Arctostaphylos Uva-ursi, Spreng.
pumila, Nutt.
Nevadensis, Gray.
Hookeri, Don.
Andersoni, Gray.
tomentosa, Dougl.
Manzanita, Parry, new.
viscida, Parry, new.
Stanfordiana, Parry, new.
insularis, Greene, new.
Pringlei, Parry, new.
glauca, Lindl.

Our California 'pungens' is Parry's A. Manzanita, and 'glauca' is his A. viscida. A. Pringlei has been distributed as A. tomentosa.

Alatypes or stenotypography, by the late H. H. Brown, 1887, 92 pp., is a treatise on a system of condensed printing. From F. W. Dunning, 32 South Division St., Battle Creek, Mich. Price, 4 cents.

The Marysville (Cal.) *Budget* is an excellent literary monthly, which we are glad to add to our exchange list.

The Century for September contains Atwater's fourth paper on the 'Digestibility of food,' which should be widely read. The numerous historical papers in this number are of greater interest and value than ever.

St. Nicholas this month contains a pleasing article 'about humming-birds,' by Mrs. Homer H. Stuart. This magazine is as interesting as when it was the organ of the Agassiz Association to the young student of nature.

Book Chat,—Brentano's, N. Y.,—is an excellent index to the periodical literature of the world for every month. It indexes the contents of about 250 magazines, including all the more prominent ones in the world. Among them, the WEST AMERICAN SCIENTIST can be found.

NECROLOGY.

Alvan Clark, one of the great masters of the mechanical arts, died at Cambridge, August 19, at the age of 83 years. He had a world-wide reputation as an astronomer and as a manufacturer of the most powerful astronomical instruments ever made.

Spencer Fullerton Baird, the distinguished secretary of the Smithsonian Institution, director of the U. S. National Museum, and Commissioner of fish and fisheries of the U. S., died at Wood's Hall, August 19. He was born in Reading, Pa., on February 3d, 1823.

WASHINGTONIA ROBUSTA.

SAN BERNARDINO, CALIFORNIA, July 30, 1887.

Dear Sir:—Yours as to palms received. The description given of robusta is same as I get from other quarters. Some also state that the leaves of robusta are more fringed with filaments than is filifera. I know the place of which you speak, but have never been "high up on the mountain." Palms, there, as well as elsewhere, grow *always in the canyons*, as you well know. Your description may apply to "far up in the canyons,"—but "up on the mountain side," is simply up on the rocks where nothing grows, for the mountain side in that locality is just bare and jagged rocks of the most desolate possible description.

Further, as to the description of robusta given, it applies to filifera as well. All palms have the yellowish hooked spines or teeth along the edges of the leaf-stems, and the leaf-stems vary in color somewhat, according to age, soil, water and other circumstances, as is the case also as to the filaments.

My opinion is, and always has been, that robusta is a myth—a false name gotten up solely to foist upon buyers a new (?) kind of seed at higher rates. I think that the whole thing started from that sentence or two in Bot. Cal., on page 485, Appendix, as to my report to Prof. Watson. I have frequent applications for seeds of robusta, but I always reply that I know of no such species, and utterly refuse to give seed under that name for any price whatever.

W. G. Wright.

ORNITHOLOGY AND OOLOGY.—This department is conducted by R. B. Trouslot, Valparaiso, Ind., and all inquiries or communications under this head should be addressed to him.

EDITORIAL.

This month we have a variety of news for our readers. Science loses heavily in the death of Prof. Baird, whose life-work is so widely know. The activity of the society of natural history, or rather the signs of future activity in the future is something for congratulation. The union of two earnest students of nature, robs us for a time of one of our workers, but will add to our number in the near future, as Prof. and Mrs. Eigenmann will make their home in San Diego, after their journeyings abroad. The plans for the buildings of the college of San Diego, to be erected at Pacific Beach, a few miles north of this city. Prof. F. P. Davidson will have charge in the new institution of the natural sciences. Various other institutions of learning are proposed, among them a University for lower California. A fine museum is secured to Coronado Beach, and another museum will probably be established in this vicinity on a basis unsurpassed by any in the United

States, not excepting our National Museum. Other work may for a few months require our issuing less complete numbers than the present issue of THE SCIENTIST. While we may issue fewer pages for a time, we hope to raise our standard of excellence still higher, and to complete arrangements for giving our patrons still more than we have attempted.

THE SAN DIEGO SOCIETY OF NATURAL HISTORY

September 2d the Society held its regular monthly meeting at its rooms on 6th street. D. Cleveland presiding. The action of the Board of Directors, thanking Henry Hemphill for the donation of a valuable collection of over 1000 species of shells, and advising his election to a life membership in the Society was reported, and Mr. Hemphill unanimously elected a life member by the Society. Several gentlemen were elected to active membership.

The plans of the proposed new building were informally discussed. D. Cleveland reported for his committee that an architect had been instructed to draw up plans for a three-story brick building with basement, 50 x 96 feet, with a handsome front. The lower floor is to be a public hall, while the upper floors are to be devoted to the museum and library, with galleries, and lighted with a large skylight.

The Society is in a transcient state, but greater activity may be looked for in the future. The Society is wealthy, and great opportunities for work are being developed.

NOTES AND NEWS.

Dr. Asa Gray and wife are expected to return from England to their home in Cambridge, early in October.

A 'University of Lower California' is to be established at Encenada de Todos Santos, Lower California. Over 400 acres of land, valued at $500,000, is secured to the institution.

Miss Rosa Smith, the celebrated lady icthyologist of San Diego, and corresponding secretary of our society of natural history, was married August 20th, to Carl H. Eigenmann, of Bloomington, Ind. Prof. Eigenmann has also made a special study of fishes. They take their bridal trip over the Canadian Pacific R. R. to Cambridge, Mass., where they will devote a year to their favorite studies.

From the present statue of the metric system, as given by a Parisian archivist, the following is deduced: Number of population of countries in which the system is obligatory, 241,073,011; number of population of countries in which the system is optional by law, 97,639,825; number of population of countries in which the system is used without legal value, 333,266,386.

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EXTRACT FROM THE PREFACE.

The kind reception given to my little book on the 'COMMON SEA SHELLS OF CALIFORNIA has induced me to prepare this larger work, embracing a wider territory, namely, that part of the United States lying west of the Rocky Mountains. The present volume includes descriptions of all the species mentioned in the former one, and also treats of many of the uncommon and minute shells which are found along the coast, from Alaska on the north, to Mexico on the south. It also describes the land and fresh-water mollusks of California, Oregon, Washington, Idaho, Utah, and Nevada; thus making it of use as a reference book for the interior, as well as along the sea-coast.

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VOLUME III. OCTOBER, 1887. WHOLE NO. 20.

THE West American Scientist.

A Popular Review and Record for America.
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C. R. ORCUTT, - EDITOR.

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THE WEST AMERICAN SCIENTIST.

VOL. III. OCTOBER, 1887. No. 30.

FOSSIL BOTANY, AND THE ADVANTAGES OF ITS STUDY.

(SECOND PAPER.)

Fossils are the remains of organized bodies, animal or vegetable which eliminated primarily from the mineral substances composing the crust of the earth, by the mysterious principles of vitality, and after using that vitality, have become imbedded in the different strata of the earth's surface by erosion, denudation, and the disintegration of the solid portions of inorganic matter brought about by rain, wind, frost, and other agencies.

These dead bodies are subsequently more or less altered in their structure and composition by chemical agencies and forces, by which the inert particles of matter are subjected to perpetual change.

The softer and more delicate portions of the animals and plants decay rapidly after death; the more durable portions resist decomposition, and are oftentimes covered up by alluvial or diluvial debris, and deposits of sand and mud, in which condition, while excluded and protected from the destructive action of the atmosphere, they are subjected to various chemical substances in solution, whereby the bones and shells of animals, and the woody and fibrous portions of plants are preserved in their original condition, or their form or structure replaced by mineral substances, changing their composition but retaining their original form and structure, rendering their identification easy, and enabling the student to compare the dead organisms of past ages with their living successors and representatives of the present. In this manner they constitute the types or characters, whose combination and position furnish us with indisputable records of the ancient history of the earth

In the reading of the book of nature, the fossil animals tell us of the topography of the earth's surface at different periods of its history, and of the existence of continents, islands, seas, bays, lakes, rivers, etc.; while the fossil plants have recorded the character of the vegetation, also the condition and changes of temperature of the atmosphere in by-gone ages.

The fossil plants of the Pliocene of Nevada County, Cal., indicate a climate analagous to that of the Southern Atlantic States of the present.

The fossil palms which are found in abundance in the lower lignitic measures of this continent, especially in Colorado, and even so far north as Vancouver's Island seem to indicate a gradual dimunition of atmospheric heat, from the Eocene to the Glacial Epoch.

The two species of Sequoia of California are rare and venerable remnants of the flora of the Tertiary, passed through untold centuries, giving us a glimpse of the living representatives of the giants of former periods.

Many of the characters which would be of interest to the reader of the book have doubtless been obliterated, and others so mixed and scattered that, in the present state of our knowledge, they correspond to the "pi" of the printer, and require the skill of trained and advanced scientists to arrange them in the order of their continuity.

Prof. Leo Lesquereux says, 'For the determination of the epochs, if we may call epochs arbitrary divisions of time established for convenience by geologists, we have to consider the documents relating to their history, and those are mostly the fossil remains of their floras.'

During the Tertiary period, large portions of this continent were covered with swamps and heat-bogs which served as reservoirs for the deposit of the vegetable remains which form the lignites and coal.

According to Dr. J. G. Cooper, who has made a special study of the coal-bearing rocks of the Pacific Coast, the fossil shells found in connection with the coal, show that it was formed by accumulations of trees, etc., in shallow bays, at the mouths of rivers, in fresh or brackish water, and therefore along the shores of older continents or large islands.

The true coal of the carboniferous rocks in other countries was formed from the tree ferns, Algae and other plants of low organization. The coal of our coast contains remains of coniferous and dicotyledonous trees, and has hence been considered of more recent age, namely, cretaceous and Tertiary.

The coal-beds of Mount Diablo, Cal., Bellingham and Coos Bays, and Vancouver's Island are of cretaceous or Eocene age, while the lignite beds of Ione Valley and of Lincoln, California, according to the testimony of the fossil plants found in them, are probably of Pliocene age.

Dr. Hayden has estimated that the Great Lignitic or Western Coal Regions cover an area of, at least, 100,000 square miles.

At the close of the Pliocene Epoch, evidences are found of great changes in the topography of this region by volcanic action, which destroyed the then existing tropical fauna and flora.

This was followed by a period of intense cold, during which time many of the terraces and mesas of our coast were planed down by the slow but irresistible action of immense glaciers and sheets of ice.

Many northern species of land shells and plants followed these glaciers and ice-fields, and are now living where, previous to the Glacial Period, species lived and grew which are now extinct in this region, but are found living nearer the tropics.

Parallel illustrations are noticed by Grant Allen, an eminent English writer, who, in a recent article on the White Mountains of New Hampshire, says:—"A glacial fauna and flora still cling to the heights. Polar butterflies stranded there at the end of the Great Ice Age, keep up to this day the lineal succession of their little colony, though no others of their kind are again to be found in all America, till you reach the frozens shores of Labrador."

The plants are everyone of Arctic species. and he enumerates several, all of which were once common glacial forms.

The history of the world from its beginning, is a history recorded at every step, but the records are buried and concealed as fast as they are written, and their reading can only be partially accomplished, and that by patient observation and study, by many and widely separated observers.

The combined readings of these various observations constitute the summary of our knowledge of the past, and from which we make our deductions of the probabilities of the future.

Lorenzo G. Yates.

MUMMY EYES FOR JEWELRY.

(Read before the New York Microscopical Society, October 2d, 1885, by GEORGE F. LUNZ.)

The subject which I take the liberty of presenting to you this evening was brought to my attention by a number of articles that recently appeared in the daily papers. In these articles it was stated that a necklace was being made by Messrs. Tiffany & Co. of petrified human eyes; that arsenic had been used in the preparation of these eyes, and that three workmen who were engaged on the necklace had been made suddenly ill by the deleterious poison, and refused to resume work on such dangerous material. Through the kindness of Mr. W. E. Curtis I was enabled to bring the material with me to-night, and on inquiry at headquarters the facts were elicited, which I shall present to you. An explanatory letter from Mr. Curtis was likewise loaned to me by Mr. C. Hanford Henderson, and this, with the information gleaned from Messrs. Tiffany & Co., has enabled me to give a true and satisfactory account of the matter. Mr. Curtis writes that "mummies are very common in Peru, so common, in fact, that they can readily be obtained at $4 or $5 apiece." The writer himself

recollects that some years since they were sold as low as $11 each at Leavitt's, in this city. Mr. Curtis continues, "that, having learned from a young lady in New York that they were sometimes used in jewelry, he determined to procure some for a necklace. This he did without difficulty, most of the eyes being obtained at Arica, Peru."

Prof. Baird also informs me that the so-called mummies' eyes are well known, and that the first he ever saw were brought to the United States from Peru by Lieut. Gillis about thirty years ago. Professor Baird adds that they are, without question, the crystalline lenses of the eyes of a species of cuttle fish (squid). This view is corroborated by Prof. Verrill, who says there is a large squid, very common on the Peruvian coast, the lens of the eyes of which is about as large as these so-called mummies' eyes.

Some of the lenses from the eyes of these cuttle fish measure only 5 mm., but the majority of them are 12 mm. in diameter, and some as much as 18 mm. The color, really only the result of age, is a dark amber yellow or golden bronze externally on the convex side. In all cases they are nearly opaque, and have the appearance of an onion skin or any other sack-like concretion. On the flat side, however, the color is much lighter, and a little play of light is noticeable. The surface is rough, as if an exudation had hardened on it. The structure of the lenses is like that of a pearl, an aggregation of successive enveloping layers, which are marked on the surface by sets of concentric rings. It is also plain, from these rings, that the lenses are sections, constituting only about one-half of the original lenses of the fish, the intention undoubtedly being to produce additional luminous effect by this series of hemispherical reflectors.

The crystalline lens of a human eye would not be so large as even the medium sized lens exhibited here this evening, and is so exceedingly delicate that it can only be preserved at all by the greatest care.

In many fishes, and especially the cuttle fish (squid), the lens of the eye contains so much solid matter that it will dry up in a short time, and with very little contraction, into a hard, transparent mass, which would probably be durable.

On the contrary, Prof. Raimondi, the most eminent ethnologist of Peru, believes these eyes to be human, and Dr. Tschudi, of Vienna, is said to support him in this theory.

The region where these mummy eyes are found is rainless, and the mummies were dried in a sitting posture in the salty sand or the nitre beds, often thousands of them at one place. This being the case, they must have been exposed to the public gaze, and the embalmers would naturally wish to make the appearance of the dead as attractive as possible. Hence it is probable that the cuttle fish eyes, which were inserted into the empty sockets, were cut

into two equal parts, in order to obtain greater luster and give a natural brightness to the eyes of their dead.

The three workmen who were engaged in polishing these eyes were all affected soon after working on them. The sawing and polishing were done at different times, and in each case the same result followed, so that the workmen are confident that their illness was caused by the inhalation of dust during the sawing. The youngest, a boy of 16, was taken sick after working only a few hours. His illness consisted of headache, billiousness, and vomiting, and lasted for one day. Another workman, a strong, hearty Frenchman, about 45 years of age, and weighing nearly 200 pounds, reported that he was taken sick with nausea, sick headache, and vomiting, and noticed a disagreeable, metalic taste in his mouth during his entire illness, which lasted four days. The other, a German lapidary, about 40 years of age, was affected shortly after working at the eyes with an eruption of small pimples over his entire body, and when any of the affected parts were rubbed a swelling immediately arose. This rash was perceptible for over a month. From the fact that these three cases occurred in one workshop, and soon after work was commenced on the eyes, the men very naturally reasoned that the eyes were the cause of their sickness, and expressed a desire not to resume work on them.

In response to inquiry, Prof. Baird writes that he never heard that poisonous qualities were inherent in the eyes. If they are really poisonous, it surely cannot be from any preparation used to preserve them, for no preservative was necessary, as would have been the case if they were human eyes. It has been observed, however, that in this case certain alkaloids may be generated by the decomposition of the organic constituents of the eyes. This matter will soon be determined pathologically by myself. The United States survey chemists are also examining the lenses, to see what alkaloids, if any, are present.

As ornaments these eyes are truly beautiful when the exudation on the cut surface has been removed, and they are finely polished. They vary in color from a light yellowish amber tint to a dark yellow, yellowish brown, or rich amber brown, similar to that from Catania, Sicily. In some cases the colors are found in alternated bands, as in the Mexican fire opals from Querertaro. Although the reflections lack the play of colors found in the opal, the tints are warmer and more pleasing. The luster on the uncut rounded sides is pearly. With a proper gold mounting, these eyes would give a very beautiful effect in jewelry, although moisture would be likely to injure the polish.—*Jewelers' Circular.*

The Coronado Beach Co. has contracted with Col. Von Schmidt for the dredging of Glorietta Bay, and Spanish bight, portions of San Diego Bay, at a cost of $100,000.

EXTENDED RANGE OF SOME CALIFORNIAN PLANTS.

Since the publication, seven years ago, of the second volume of the Botany of the State Survey, with its valuable supplements, no regular account is kept, in any journal, of the re-discovery of rare or long lost species, or of the extending range of such as were formerly believed to be somewhat local. Yet notes of this kind, always giving light upon the highly interesting subject of plant distribution, are very important to be preserved. A few such are here offered.

In a small parcel of specimens collected this year in the upper part of Monterey County, by Rev. J. B. Hickman, and sent to me for identification, I find the following worthy of mention. Lupinus luteolus, (Kellogg) not before reported from any point south of the Napa and Sacramento valleys; Eriogonum trichopodum, (Torrey) a species belonging to Arizona and New Mexico, also the deserts of south-eastern California, and now in San Benito Co., just east of Monterey, at least three hundred miles distant from any other recorded habitat of the species: Phacelia viscida, (Torrey) and Euphorbia histula, (Engelm), both hertofore supposed to be restricted to regions south of Point Conception; Phacelia circinatiformis, (Gray) a plant so rare that no one has seen it, until now; since Douglas' time, and he must have obtained it in this same region in 1831 or '32. This is, indeed, a most noteworthy re discovery. Mr. Lemmon obtained this year Eschscholtzia rhombipetala, (Greene) in San Luis Co., at least one hundred miles below its recorded habitat, i. e., the plains of the lower San Joaquin. The rare Eriogonum dasyanthemum, (Torrey & Gray) has lately been found plentiful in the vicinity of Vacaville, in the lower Sacramento, region by Messrs Philip Woolsey and Willis Jepson, while Mr. V. K. Chestnut has brought specimens of Hemizonia Heermanni, (Greene) from near the summit of Mt. Diablo, very far to the northward of the original Kern Co. locality. The rare Ranunculus canus. (Bentham) re-discovered a year or two since by Mrs. Bidwell at Chico, I found this year, in a fine state, considerably better answering to the requirements of Bentham's description, on hills near Antioch. In this locality only, and it must be approximately the original one of Hartweg, has the foliage of the plant all that abundance of gray, or whitish silky pubescence which suggested the name of the species. The Chico plant is, in this respect, less unlike R. Deppei, (Nuttall) or what has wrongly been called R. Californicus.

In our standard treatise on Californian botany above referred to, the note on Stachys Chamissonis, (Bentham) is this: "Wet grounds; common around San Francisco Bay." I have wondered that, in all my years of botanizing in the familiar region named, I could never meet with this plant. It is common enough in its

locality, which is the wooded region at the northern base of Mt. Tamalpais, the oceanward not the bayward slope; and the size of the plant is remarkable, far above that ascribed to it in the book. I saw few specimens so low as five feet, most of them measuring ten or twelve, and some more than that.

Campanula exigua, (Rattan) first detected by that author on the top of Mt. Diablo, was shortly afterwards obtained on Tamalpais, by Mrs. Curran, and this year Dr. Parry has shown me a specimen found by himself on a hill near Calistoga. Aatragalus pycnostachyus, (Gray) first collected at Bolinas Bay, thirty miles above San Francisco, by Mr. Bolander, in 1863, was not otherwise known until 1882, when Mr. Parish found it at Santa Monica, more than three hundred miles south of its classical habitat. In 1885, Mrs. Curran discovered a third locality for it, namely; in Santa Barbara Co. near the village of Santa Maria. I am able to certify that it is still growing rankly in the original locality on Bolinas Bay, where I collected it in September just past. Although the land is now fenced and used as a cattle and hog pasture, the rare plant thrives unharmed; its strong nauseating odor being its protection no doubt. It must be poisonous, as many of its more familiar companions are well known to be.

Edward L. Greene.

THE LATE PROFESSOR BAIRD.

We have received from Dr. L. G Yates a copy of his memorial sketch of the life and works of Professor Baird, recently read before the Santa Barbara Society of Natural History. After enumerating in brief, the various positions held by the deceased, the valuable collections made by him and the great services rendered by Professor Baird as well as the well merited honors and honorable recognition which he received by virtue of his great ability and exalted character, Dr. Yates continues "it is impossible to estimate the influence which Prof. Baird has exercised in the development and advancement of the study and knowledge of natural history in its various branches.

A few years ago collectors and students were almost entirely dependent upon the Smithsonian Institution * * * * * * for aid and information in relation to the collection and preservation of specimens. The writer of this sketch received his first impetus in the study of conchology from a collection of shells made by the Wilkes and other exploring expeditions, which he received through the kindness of Professor Baird, and notably in the correspondence continued from the time when the writer, then a boy of fifteen years of age, received valuable aid and instruction from him. Up to within a very few years, nearly all the large number of letters received are in the Professor's hand writing, and

not as is usual in such cases * * * where the body of the letter is in the handwriting of a clerk, while the principal only signs his name * * *

Future historians of American science will appreciate the labor and research of a man, who, thoroughly qualified to fill the position he held, had the rare faculty of personally influencing his associates, and imbuing them with a portion of his self-sacrificing devotion * * * which combined with rare skill in organization and great power of continuous application have accomplished what few men could have done.

The death of no other individual connected with the government of the United States could leave so great a void, nor one so difficult to fill as has the death of Professor Baird.

In his death the Smithsonian Institution has lost its best worker, and one who has done more than any other individual towards the carrying out of the intensions of its founder in making it an object of interest not alone to scientists of North America, but throughout the civilized world, and also to the general public. Its evident usefulness under his administration convinced politicians and statesmen of the necessity of fostering it and giving it such national aid and countenance as would enable him to make it the model institution of the world. He organized and built up the institution in such a manner that his successors may, with perfect safety, follow out his methods,"

GREAT DESTRUCTION OF BIRDS.

The New York *Times* states that on a recent morning there were 1300 dead birds at the foot of the statute of Liberty on Bedloe's Island. They had dashed themselves against the light during the night. These birds were flying south to escape the cold. There were a hundred different species represented among the dead. The largest bird was a Canadian woodpecker and the smallest a humming bird. It is expected that thousands of birds will perish because of this great light, which can be seen at a distance of thirty-six miles.

The number of species given above is probably greatly exaggerated. The San Francisco *Chronicle* gave the following report:

Professor Ridgway, curator of birds at the Smithsonian Institution, says the specimen birds which were sent to him from New York, where they were found dead near the Bartholdi beacon light, are nearly all of the species known as "warblers." They are insectivorous. These birds are night-migratory in their movements, and thousands have been attracted from all directions by the brilliancy of the light and killed by flying against the glass. He says scientists fear the destruction will be so great that the species will become extinct before many years. He also reports that

there have been found a great many crows and wild ducks near the Washington monument. They fly at dawn when the mists are thick, and are killed by contact with the monument, which is hidden in the clouds. He also reports that great numbers of wild geese have been noticed flying over the city. This, he asserts, is an infallable indication of an early and severe winter.

On the morning of October 14th we found a mountain plover (Ægialitis montanus, Cassin) at our door which had evidently destroyed itself by dashing against the electric light mast at our corner, 21st and J streets. On the two succeeding mornings we found several plover, two ducks, belonging to different species, and a wild canary at the base of the mast.

NOTES ON THE POWER OF SCENT IN THE SEXTON BEETLE.

In the summer of 1886, while on one of my collecting trips in Southwestern Iowa, I happened to kill a small specimen of the lizard tribe, and as I had not seen anything of the kind I started to take it home for further examination, but the day was warm and it decayed rapidly, so I threw it down beside the road and left it. The next day I had occasion to visit the same locality again, and glanced around to see what had become of the lizard. It was still there, but partly buried in the earth. Upon a closer examination, I found three Sexton Beetles at work upon it, digging under and around it. As I had heard a great deal about the power of scent in these insects, I resolved to try an experiment. I removed one of them about four feet from the lizard, with the wind blowing from the insect towards the dead lizard. All was quiet for a moment, and then the beetle arose with a buzz, and alighted upon the exact spot from which it had been taken. Thinking that the wind might have blown it there by accident, I again removed him about four feet away, at right angles to the direction of the wind, and it again returned to the same spot. One more trial, and it seemed to get out of patience at being tampered with and flew away.

L. R. Lighton.

Leavenworth, Kansas.

C. G. Pringle, the enthusiastic botanical explorer, is operating in Chihuahua, Mexico, with good prospects for a large collection of new and rare plants. A postal from Cusi, dated September 6th, reports him in good spirits. The frequent rains have produced an unusual growth of vegetation, and Dr. Edward Palmer, also botanizing in Mexico, reports the same favorable condition.

EDITORIAL.

The Editor has had the pleasure this month of having the companionship of Prof. Robert E. C. Stearns, of the United States National Museum. Dr. Stearns visited his old home at Berkeley, California, where he was connected for many years with the University of California, and spent a few weeks at San Diego in the interests of the U. S. Geological Survey, with which he is also connected. He has returned to Washington, D. C., with data relating to thirty localities in this county where fossil remains have been found, together with fifteen boxes of specimens, mainly fossil shells, collected in this city, of which we hope to give our readers a report in the future.

A large number of very interesting and valuable papers are at hand, and for which we have to thank Professors W. G. Farlow, T. H. Lewis, Wm Trelease, Robert E. C. Stearns, Geo. G. Groff, Drs. C. C. Parry, R. W. Shufeldt, J. G. Cooper, G. W. Barnes, Messrs. E. Hiltebrand, G. W. Lichtenthaler, the Bancroft Co., Chas. P. Guelf and others.

AMONG THE MAGAZINES.

St. Nicholas for October is the last but not the least excellent number of the current volume. A charming story by Miss Alcott, with which it opens, lends strength to the hope that there are "more to come" in the new year of *St. Nicholas*. The present story is entitled "An Ivy Spray." It is a kirmess story, and it tells in a strong, helpful style how a brave girl danced her way to happiness.

Dr. C. Fred Pollock, author of several medical works, and a prominent physician of Glasgow, Scotland, begins in *The Chautauquan* for October, a series of articles on physiology, which are to continue through the year and form a part of the Required Reading of the C. L. S. C. Original drawings by the author add much to the clear understanding of the subject.

The frontispiece of the October *Century* is a striking portrait of Harriet Beecher Stowe, engraved by T. Johnson from a photograph by Sarony. This protrait is apropos of a paper by James Lane Allen, entitled "Mrs. Stowe's 'Uncle Tom' at Home in Kentucky," which recounts the life of the Kentucky slave of the old time, in a series of typical scenes, pointing out some considerations which it is thought should qualify Mrs. Stowe's point of view. The illustrations, by Mr. Kemble, drawn from life, reproduce characteristically the epoch which Mr. Allen describes. A sketch is also given of the mistress of that time and her round of duties.

A GLANCE AT BOOKS.

Scientific Methods of Capital Execution. By J. Mount Bleyer, M. D. J. Fitzgerald, Publisher, 24 East 4th St., New York. Price, ten cents.

Whether the capital execution of criminals is or is not a measure necessary for the defense of the community may be an open question: with regard to the barbarousness of the method of doing malefactors to death by strangulation, there can be but one opinion. It is indeed a brutal, and in very many instances a bungling performance. The present treatise shows how a capital sentence may be executed "decently and in order," and without shocking the humane sentiments of the community, by invoking the aid of electricity, or by the administration of sundry chemical agents, as morphia. prussic acid, chloroform, etc. In an appendix is given a striking essay by Park Benjamin on Capital Punishment.

Mineral Analysis, by Prof. G. G. Groff, price, 40 cents.

This little work is designed as an aid to teachers and others in recording the physical and chemical properties of minerals. Address the author at Lewisburg, Pa., the blanks will be found very useful and convenient.

NOTES AND NEWS.

Chas. E. Stone, Spencer, Mass., has the honor of being the first life subscriber to The West American Scientist.

Aylmer Montgomerie intends to travel for a considerable time in South America, and also proposes to become a life subscriber to this magazine.

G. W. Lichtenthaler expects to be in San Diego again this winter, and to increase his fine collections of shells and algæ.

B. W. Evermann is reported as making collections at Guaymas, on the east coast of the Gulf of California, and Walter Bryant as also collecting on the gulf shores this season.

A fine living example of a Mamillaria cactus from the plains of Canada has been received from Mrs. Rosa Smith Eigenmann, who, with her husband, is now pursuing her favorite studies at Cambridge, Mass.

COURTESY.

How sweet and gracious, even in common speech.
Is that fine sense which men call courtesy;
Wholesome as the air and genial as the light,
Welcome in every clime as breath of flowers,
It transmutes aliens into trusting friends,
And gives its owner passport round the globe.

James T. Fields.

THE RESTLESS SEA.

O, the sea, the restless sea!
Emblem of humanity!
Where's the oil to still the waves?
Check their making watery graves?

High the billows toss and roll,
Low the liquid shallows stroll,
Like the human seas of earth,
Wild with sad or joyous mirth.

Heaving, tossing, never still,
As the surging human will
Follows the receding wave,
Surging to a lonely grave.

So do people in their wrath,
Travel in an unknown path,
Leading to the very brink
Where the fatal depth would sink.

E'en the most substantial boat,
Sailing windward or afloat,
Sailing east or sailing west,
Change they find, but never rest.—*L. M. Smith.*

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A collection of fossil ferns, flags, insects, cones, seed-pods, fish, etc., to exchange or for sale. J. G. Wainwright, Waukegan, Ill.

A rare mineral for every one hundred neatly written names and addresses. Any number taken. C. Haddaway, Easton, Md.

Various natural history papers, *Hoosier Naturalist*, 3 nos. *Sunny South Oologist*, etc., to exchange for coins, minerals, Indian relics or stamps. W. P. Arnold, Shannock, R. I.

Harry B. Booth, 25 Northfield Place, Manningham, Bradford, Yorkshire, Eng., wishes to exchange with American collectors in ornithology and oology.

Collection of birds' eggs for one of curios, Indian and mound relics, etc. Arthur B. Roberts, Weymouth, Medina Co., Ohio.

Birds' eggs' in sets or single, for numbers of *Naturalists' Companion*. C. B. Johnson, Redwing, Minn.

Calcite, Petrified wood, selenite, stalactite, red granite (used exclusively in the construction of the capitol at Austin), fossil and recent shells and eggs for minerals, coins, stamps, shells, eggs, seacurios, fossils and woods. Glen Stearns, Georgetown, Texas.

Dnrbins' Catalogue (14th edition), *Naturalists' Companion*, Vol. 1, No. 2, 50 vars. stamps, and philatelic papers for birds' eggs. Write first. H. R. Sharples, box 1968, West Chester, Pa.

Gray's First Lessons in Botany, copies of *Boston Journal of Chemistry*, *American Naturalist*, and other natural history papers and books, for Indian relics, minerals, curiosities, stamps, etc. J. H. Merrill, Wenham, Mass.

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Odd numbers of *Naturalists' Companion*, and other natural history papers, 5 cents each, or in exchange for coins, stamps, or specimens of any kind. C. R. Orcutt, San Diego, Cal.

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A large number of very fine books for offers. W. S. Beekman, West Medford, Mass.

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VOLUME III. NOVEMBER, 1887. WHOLE NO. 31.

THE West American Scientist.

A Popular Review and Record for America.
Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - EDITOR.

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FOSSIL BOTANY, III.

In regard to the question of evolution in its broadest sense, fossil botany furnishes but little satisfactory evidence in its favor, aside from the facts that, classes of plants which are now small in extent, were formerly much more important factors in the floras, and that other classes now largely represented by living plants, were formerly of but small proportions relatively, and that there has been a continuous succession of species.

There should be intermediate forms connecting species, genera, and other divisions of plant life, in order to prove conclusively that all plants, living and extinct, originated in, and descended from, the Algæ, the oldest plants of which we have any knowledge, and which have come down through all the ages, but little changed in appearance from their earliest type.

Other divisions of the vegetable kingdom have appeared at various periods of the world's history, and our records fail to show that they have had any closer affinities with the older forms of vegetation than is apparent in the flora of the present.

The Algæ were as distinct from the mosses; the mosses just as different from the ferns, and the cryptogams or flowerless plants as readily separated from the phanerogams or flowering plants as they are now.

We do not find that the Algæ were merged or developed into phanerogams with final loss of identity, as would be the case if all plants had descended from the earliest type.

The records of geology, incomplete as they are, show that nature, under certain conditions and at various times, evolves forms of animal and vegetable life, which cannot, by any method of classification, be followed or traced back to any one universal type or form.

We can go back to certain points where we are stopped by an intangible but impassable veil, behind which nature hides her secrets; and we are unable to learn how and why these changes were accomplished, we only know that they were.

During the tertiary age, a large portion of the dry land of our time was covered by oceans, whose deposits, where they have not

been removed by denudation and detrition, overlie the Cretaceous and others of the olden rock formations.

While the extensive fresh-water sedimentary deposits in which the fossil plants and insects are found in great abundance, and the large quantities of fossil bones of distinct mammalians, and the shells of Mollusks, show that the continents and islands of the period were intersected by extensive lakes and inland seas, marine bays, and arms of the sea penetrating deeply into the land; and especially during the Eocene or older tertiary, Hakeas, Mimosas, Palms and many other interesting trees and plants grew in great abundance in the *then* tropical atmosphere of the present temperate and frigid zones.

From the Miocene plant beds of Greenland, one hundred and thirty-seven species of fossil plants have been described or identified, including among a large number of trees of the temperate zone, species of Magnolias, Limes, Walnuts, etc.; their fruits and seeds in various stages of development are found with them, showing that they grew where they are found, and this to within eight degrees, fifteen minutes, of the North Pole, where darkness now reigns during six months of the year, and where the country is continuously covered with ice and snow.

During this period the vegetation flourished, and their remains were deposited in the estuaries of the rivers, forming the coal which is now being mined on this coast, supplying us with fuel wherewith to cook the vegetable products of our own time.

Among the trees of the period under consideration, whose fossil remains have been discovered and determined, are numerous Conifers, Eucalyptus, Mimosa, Olive, Diospyros, Ailantus, Ficus, Almond, Cinnamon, Salisburia. Aralias, Anona or Custard Apple, Sterculia, Oreodoxites (resembling the Oreodoxia regia or Royal Palm of South America,) and many other Palms; Melous, Gourds, and many trees and plants resembling those with which we are familiar.

Among ferns are extinct species of Osmundo, Pteris, Gymnogramme, Lastrae, Diplazium and Lygodium, besides the extinct genera Andiantites and Sphenopteris.

The most beautiful fosssil leat beds belong to the Upper Miocene, in the valley of the Rhine.

They were explored by Professor Heer, who published a large and valuable work on the subject. In this deposit the record is so complete, that distinct sprays of a kind of camphor tree are found with flowers, fruits and leaves; on some remains leaf-fungi can be detected, and the season of the year when certain portions of the deposits were made, can often be inferred from the plants being in their spring or autumn state of growth.

In that locality, about one hundred and eighty species have been identified, among them seven kinds of Palms; the ferns are precisely the same as our recent ones, but of a sub-tropical type.

Seventy-two of the number of the species identified, he considers as probable ancestral forms, identical with those now living; among these are the California Redwood; two species of American Poplars, and Swamp Cypress, together with other trees now found living in China, Australia, Canary Islands, Europe, and other countries.

Lorenzo G. Yates.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

October 26th, 1887.

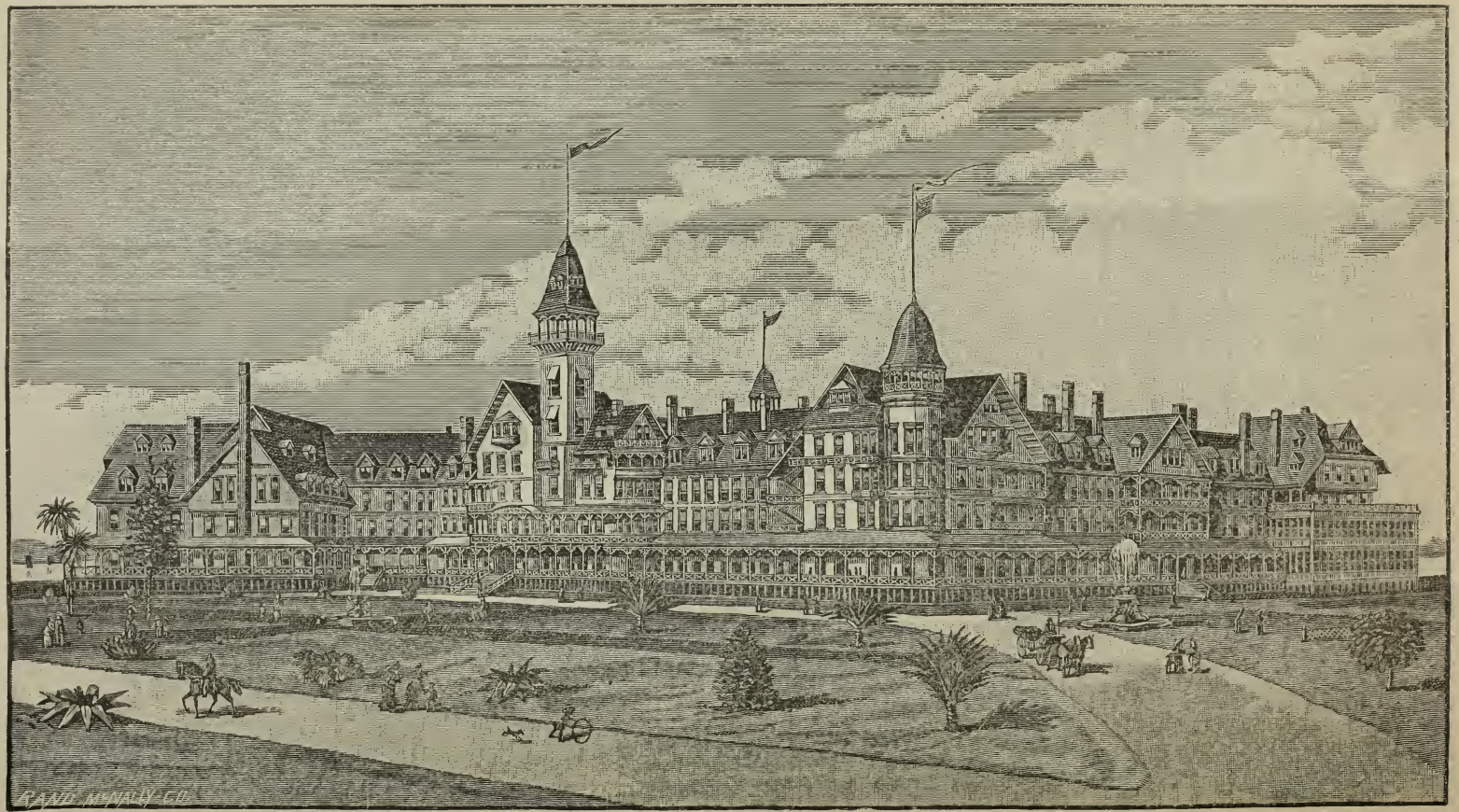
A letter was read from A. H. Breckenfeld of Los Angeles, expressing continued interest in the work of the society, and sending a specimen of marine diatoms on seaweed from Professor Romyn Hitchcock. The material was collected at Sakai, Japan.

Dr. Ferrer continued his demonstrations of new accessories, of which a part was given at the last meeting of the society. He had just received from Zeiss of Jena a number of low-power objectives and oculars. These are apochromatic and are made of the new glass the invention of which excited so much interest a year or so ago. Beside the lenses for ordinary use to the microscope Dr. Ferrer exhibited projecting eye-pieces which are inserted in place of the ordinary eye-pieces when the instrument is used in connection with a micro-camera for photographing. Dr. Ferrer said he had but just received the glasses and not fully tried them, but in his preliminary tests of their powers he was convinced of their wonderful definition. Comparative examinations were made of the Zeiss ordinary eye-piece and the "compensating eye-piece," which occupied the members for a long time and afforded much material for discussion.

The society received several donations of material intrinsically valuable and still more to be prized because of its associations. 'Moeller's typen platte' and 'probe platte,' a number of valuable micro-photographs and a large collection of slides were received as a gift from Mrs. W. Ashburner through Mr. Norris. They had been part of the collection of the late Professor W. Ashburner and will be cherished by the society which held him in such high esteem. There was also a donation by Mr. Norris of a number of slides and prepared diatomaceous material, and upon motion of Dr. Selfridge the thanks of the society were extended to Mrs. Ashburner and Mr. Norris for their generous gifts.

Mr. Norris exhibited a slide mounted by Bourgoyne of Paris, which contained 215 distinct varieties of diatoms from the famous Santa Monica earth, all arranged in beautiful form. This slide was presented by Bourgoyne to Professor Ashburner.

Edward J. Wickson, Recording Sec'y.



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The dining hall will seat one thousand persons. There are about 800 rooms in this hotel, which completed and furnished, will have cost over $1,600,000.

NOTES FROM COLORADO.

Aster campestris Nutt in Colorado. Two forms of this Aster, which is new to the Colorado flora, were collected by me at the Twin Lakes on August 16th last. They were kindly identified for me by Dr. I. M. Coulter.

Colias eurytheme. I find a form of the female, in which the yellow color is replaced by white, with the exception of the orange spots on the hind wings, occurring with the type near West Cliff, Custer Co., Colorado. This variety, which is analagous to similar forms in other species of the genus (E. G. C. edusa var. helice Hb.) may be called C. eurytheme var. pallida.

Linum perenne form albiflorum. On october 10th, I picked a pretty variety of L. perenne in Montrose Co., Colorado, not far from Cimarron. It was lower growing than the type, and had white flowers with blue radiating lines.

T. D. A. Cockerell.

West Cliff, Colorado, Oct. 30th, 1887.

FOSSIL FERNS.

Thinking an article on the fossil ferns of this section might be of interest to your readers, I will begin by stating that this famous fossil bed is in Grundy County, Illinois. The bed is about three-fourths of a mile long, and situated in the bed of a creek. The fossils are about twenty feet from the surface, imbedded in steatite, inside an iron-stone nodule, shaped like a kidney. On being broken open the fern, plant or animal remains are beautifully traced, nearly equal to life. I believe there has been between three and four hundred species classified from this locality. The more common are Neuropteris hirsuta, Pecopterus mixta and Pecopteris villosa. Owing to constant collecting for many years, fossils are becoming quite difficult to obtain. Another drawback is that a few individuals are trying to control the entire ground for money-making purposes, and asking outrageous prices for the fossils; and having bought the sole right to collect, keep many enthusiastic collectors at bay. *O. D. Walbridge.*

GREAT AGE OF FISHES.

It is not generally known that there is hardly any limit to the age of a fish. The late Prof. Baird, of the United States fish commission, is the authority for the statement that there is authentic evidence to show that carp have maintained an age of 200 years.

There is a tradition that within fifty years a pike was living in Russia whose age dated back to the fifteenth century.

There are gold-fish in Washington that have belonged to one family over fifty years. They do not appear much larger than when they were originally placed in the aquarium, and are every bit as lively as when young.

The Russian Minister says that in the royal aquarium at St. Petersburg there are fish to-day that have been known by the records to have been in them 140 years. Some of them are, he says, over five times as large as they were when first captured, while some have not grown an inch.

An attache of the Chinese legation says that there are sacred fish kept in some of the palaces in China that are older than any of those in Russia.—*Philadelphia Press.*

A CURE FOR WOUNDS.

The smoke of woolen rags is a cure for the most dangerous wounds. A lady of my acquaintance ran a machine needle through her finger. She could not be released till the machine was taken to pieces. The needle had broken into her finger in three pieces, one of which was bent almost double. After repeated trials the pieces were extracted by pincers, but they were very strongly imbedded. The pain reached the shoulder, and there was every danger of lockjaw. The woolen rags were put over the coals, and she held her finger over the smoke, and in a very short time all the pain was gone and it never returned, though it was some little time before the finger healed. This is but one of many instances of such cure, some of them taking place after several days from the time of the wound. Let woolen rags be kept sacredly and always at hand for wounds. The smoke and stench will fill the house, perhaps, but that is a trifle when the alternative is lockjaw, or even a long, painful sequel to a wound. Another instance was the wound made by an enraged cat, which tore the flesh from the wrist to the elbow, and bit through the fleshy part of the hand. One ministration of the smoke extracted all the pain, which had been frightful.—*Boston Transcript.*

A crank in Savannah, Missouri, shot at the woman who refused him, but the ball was stopped by her bustle, made of old newspapers, and she was uninjnred. Now is the time to subscribe.

THICKNESS OF CLOUDS.

Capt. H. Toynbee, of the London Meteorological Society, has arrived at the conclusion that clouds of less than 2000 feet in thickness are seldom accompanied by rain; and if they are it is very gentle, consisting of minute drops. With a thickness of between 2,000 and 4,000 feet the size of the drops is moderate. With increasing thickness comes increasing size of the drops, and at the same time their temperature becomes lower, until, when the thickness is greater than 6000 feet, hail is produced.

EDITORIAL.

With this number we close our third volume. The WEST AMERICAN SCIENTIST in entering upon its fourth volume hopes to receive the continued support of its readers in both the literary and financial departments. Many new contributors have promised articles for the coming year. We shall probably illustrate more freely, and other improvements we trust will appear in the December number. This month we lack time to prepare a more complete number such as our readers have a right to expect, but we trust they will excuse us in consideration of what we hold in store for them.

A GLANCE AT BOOKS.

NATURAL LAW IN THE BUSINESS WORLD. Messrs. Lee and Shepard, Boston, are about to issue a new and revised edition of this valuable work, by Henry Wood, which has been very widely and earnestly commended by the conservative press and the best public sentiment of the country. This book makes a telling application of the immutable principles and tendencies of natural law to the live questions of political economy, including labor problems, socialism, arbitration, economic legislation, wealth and its distribution, panics and their causes, railroad consolidation, corporations, and numerous other related and timely topics. Solid and irreversible business principles are crystalized into an harmonious and impregnable *system*, as distinguished from all artificial and fragmentary schemes of socialism, Henry Georgeism, anarchism, and other "*isms*" of a pestilential character. All good citizens and business men will be glad to have the wholesome sentiments of this book widely disseminated as a partial antidote for the floods of false and delusive theory which are being poured out, especially among our foreign-born population.

PRE-GLACIAL MAN AND THE ARYAN RACE, a History of Creation, and of the birthplace and wanderings of man in Central Asia, from B. C. 32500 to B. C. 15000, with a History of the Aryan Race, commencing B. C. 15000, their rise and progress, and the

promulgation of the first Revelation, their spirtual decline, and the destruction of the nation, B. C. 4705, the inroad of the Turanians, and the scattering of the remnant of the race, B. C. 4304, as deciphered from a very ancient document. Also, an exposition of the law governing the formation and duration of the Glacial Period, and a record of its effects on man, and on the configuration of the globe. An account of the "Oannes Myth," and a chapter on the Deluge, its cause, locality, and extent, by Lorenzo Burge.

THE FACTORS OF ORGANIC EVOLUTION. By Herbert Spencer. J. Fitzgerald, Publisher, 24 East 4th St., New York. Post free to any address fifteen cents.

The far-reaching consequences of the doctrine of Evolution are strikingly set forth in this essay. As commonly apprehended, this doctrine is supposed to be a theory to account simply for the differences between species, but in fact it applies to Life in all its phases—not less strictly to Psychology, Ethics, Sociology, than to Physiology and Anatomy.

AMONG THE MAGAZINES.

With the current number of *The Century* Magazine begins its eighteenth year and thirty-fifth colume. As usual the November number is especially notable.

Great value and, at this time, wide popular interest attaches to Mr. Kennan's paper on "The Last Appeal of the Russian Liberals," the text of which, for the first time in English, is included in his article,—in fact, the appeal has hitherto not really been published at all. Considering the wide and growing popular interest in Russian life, literature, and politics, Mr. Kennan's series—the result of a special investigation of Russian politics, as seen both in Russia and in Siberia—is likely to create a genuine "sensation." Mr. Kennan says: "It has been my fortune in the course of the last two years to make the intimate personal acquaintance of more than five hundred members of this Russian protesting party, including not fewer than three hundred of the so-called Nihilists, living in exile at the convict mines and in the penal settlements of Siberia."

Miss Frances E. Willard contributes to the November number of *The Chautauquan*, a sketch of Pundita Ramabai. The noble work of this young Hindu has attracted wide attention, and many will be glad of this opportunity of becoming better acquainted with her history.

Louisa M. Alcott contributes one of her charming stories, entitled "Pansies," to the first number of the new volume of *St. Nicholas*. It is followed by a bewildering array of short stories, entertaining sketches, and bright jingles and verses.

DO BIRDS FLY DOWN?

I see, in a back number of *St. Nicholas*, that one of your young correspondents appeals partly to me in regard to birds flying down. But all who have written seem so well posted that I doubt if I can add anything to their knowledge.

However, I have seen a California quail, a wood-dove, and a humming-bird flying downward; but in slow flyers, with large wings and heavy bodies, the wings are used more or less as parachutes in going down; in other words, the birds spread their wings, and rely upon gravity. This I have noticed in the sand-hill cranes in their migrations along the Sierra Madres. A flock, of say a hundred, will mount upward in a beautiful spiral, flashing in the sunlight, all the while uttering loud, discordant notes, until they attain an altitude of nearly a mile above the sea-level. Then they form in regular lines, and soar away at an angle that in five miles, or so, will bring them within one thousand feet of the earth. Then they will stop and begin the spiral upward movement again until a high elevation is reached, when, away they go again sliding downhill in the air, toward their winter home. It is very evident that a vast amount of muscular exertion is saved in this way. In some of these slides that I have watched through a glass, birds would pass from three to four miles, I should judge, without flapping the wings.—*St. Nicholas.*

THE RESTLESS SEA.

O, the sea, the restless sea!
Emblem of humanity!
Where's the oil to still the waves?
Check their making watery graves?

High the billows toss and roll;
Low the liquid shallows stroll,
Like the human seas of earth,
Wild with sad or joyous mirth.

Heaving, tossing, never still,
As the surging human will
Follows the receding wave,
Surging to a lonely grave.

So do people in their wrath,
Travel in an unknown path,
Leading to the very brink
Where the fatal depth would sink.

E'en the most substantial boat,
Sailing windward or afloat,
Sailing east or sailing west,
Change they find, but never rest.

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VOLUME IV. WHOLE NO. 32.

THE West American Scientist.

DECEMBER, 1887.

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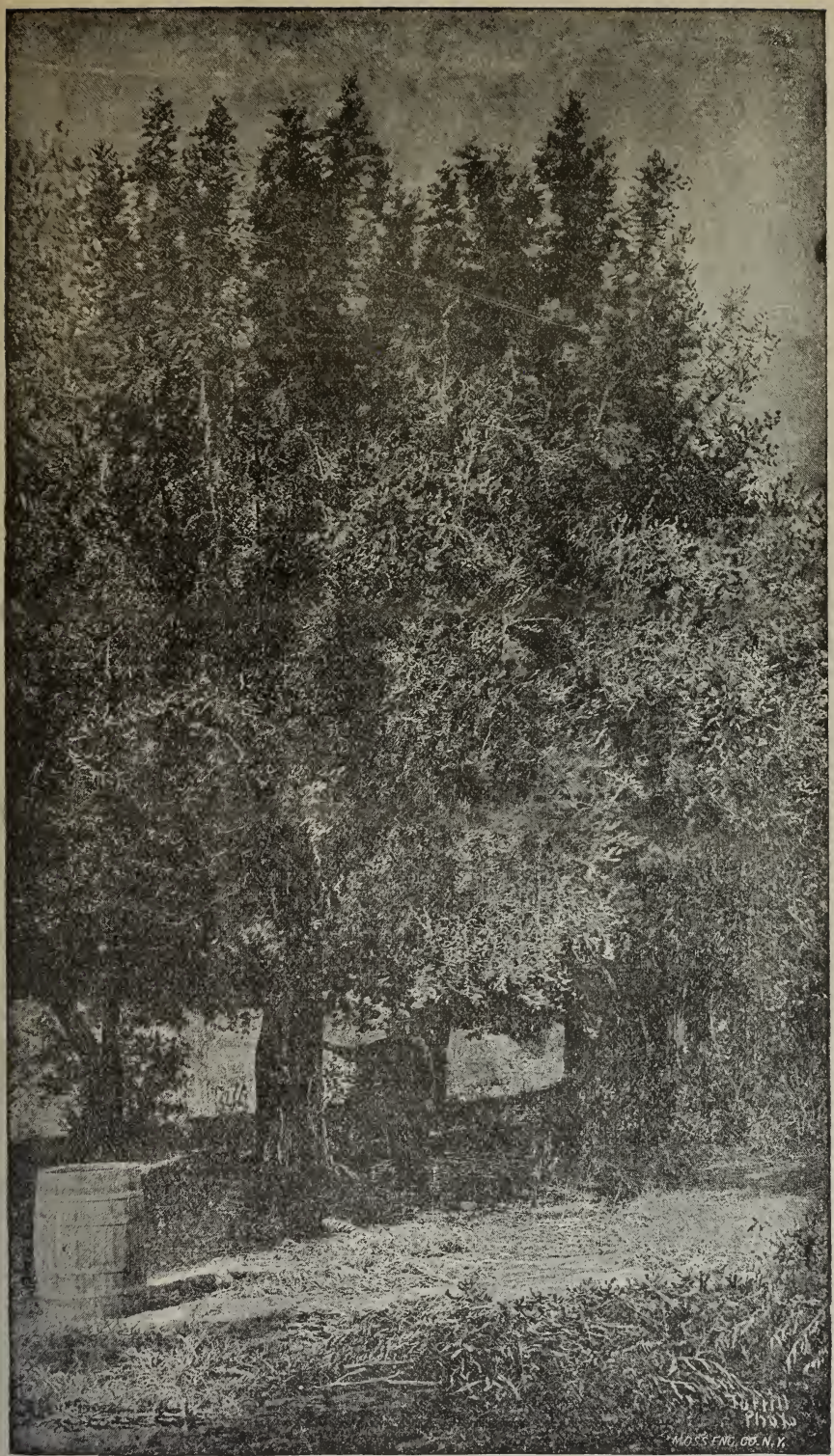


LOWER CALIFORNIA. 130 YEAR OLD OLIVE TREES, SANTO TOMAS.
(PHOTOGRAPH.)

THE WEST AMERICAN SCIENTIST.

VOL. III. DECEMBER, 1887. No. 32

REMINISCENCES OF A NATURALIST, BIOGRAPHICAL, ETC.—I.

He who has reached the meridian of life, finds himself at times looking back and surveying the path he has followed, as a traveler who has reached the summit of a hill, looks back from his elevation and traces the course of a river, through the valley or across the plain he has just left behind. He sees in the distance some peculiar point, some place of restful peace where he halted at noon, some dell or dingle that tempered the sunlight, a clump of flowers or group of trees, beautiful in color and form, that lifted his thought and spirit above toil of muscle and weariness of limb. He recalls the singing of the birds and the music of the waters, and the voice of the stranger he met upon the way. Sometimes these wayside meetings led to pleasant acquaintanceship and lasting friendships.

Memory's note book is full of leaves whose pages have never felt the touch of pen and ink, but which nevertheless are crowded closely with remembrances of men and things and circumstances, incidents of contact, due to the movement and currents of the stream of human activity and intercourse, in which all are more or less involved.

According to the mood and temper of the moment of contact, as well as to the character of our tastes and predilections, are the character of our remembrances and the permanence of these impressions or memories.

THOMAS BRYDGES, BOTANIST.

Among the many men whom I have met whose personality in many ways was congenial to me was Thomas Brydges, or Bridges, the botanist, *par excellence*, though he took much interest in other directions in natural history. Brydges was born in England, and while a young man, if I remember rightly, studied botany for a while under the direction of Sir William Hooker at Kew Gardens. Sir William was, as the present Sir Joseph Hooker is, a distinguished botanist.

Bridges married a niece of Hugh Cuming, the famous conchologist. Cuming was a cabinet maker or carpenter by trade,

who became so much interested in the study of shells that he gave up his business, bought a vessel and went forth on a grand scale to collect these beautiful forms. He visited the west coast of South and Central America, and cruised among the coral islands of Polynesian waters, and farther beyond to the Phillippines, where he made a wonderful collection of the remarkable land shells of these islands, and so on until he returned to England, and the Cumingian collection of shells became the most famous of any in the world, and continued to be so regarded for many years. Upon Cuming's death, it was purchased by the British Museum, and is now a part of that great national collection. Many of the shells (duplicates) are in other collections, the result of exchange directly or indirectly with Cuming himself. Thus the magnificent collection of Dr. Wesley Newcomb, now the property of Cornell University, contains many of the Cumingian shells; so, too, with the Dr. Isaac Lea and the Stearns collections in the United States National Museum at Washington.

It was quite natural therefore that Brydges should become somewhat interested in conchology, and give some attention to this class of natural forms.

Sometime after his marriage, Brydges removed to South America and established a botanical garden and nursery in the vicinity of Valparaiso, in Chili. His garden was located upon the bank or in the immediate vicinity of a stream. Unfortunately, a devastating freshet occurred and swept it away; this was about all the property he had, and he found himself in such a pecuniary strait that he was compelled to look about for some means by which he could support his family. He obtained orders to collect for the Zoölogical Society of London, for many private persons as well, and set forth on this work, no doubt, with his usual enthusiasm. It was while he was thus engaged that he explored the Bolivian Andes for plants, mammals, birds and shells, and in the pursuit of these came across that wonderful and magnificent lily, the Victoria regia, in the midst of one of the mountain lakes of the region named. While relating to me the circumstances of his discovery, he remarked that no one but a fellow naturalist could conceive of his feelings. His emotion at the sight of this beautiful plant as it appeared on the placid surface of the forest-rimmed lake, in every stage of development from bud to full expansion of flower, were almost beyond control. Brydges was not, however, the first discoverer of this queen of water lilies. But it was from the plants, bulbs or roots obtained by him that the first specimens were grown in England in special ponds made expressly for the purpose, and multitudes of persons were thus made acquainted with this remarkable botanical species. The discovery and sight which met Brydges' eyes, as he beheld the gorgeous array before him, of countless numbers of the Victoria regia in blossom, and its great leaves with their turned up edges,

floating upon the surface of that Bolivian lake, with many of the peculiar birds of the region, also new to him, standing upon the surface of the great pads, were to him, as a botanist, perhaps, as much a wonder and delight and as much of a crowning glory to his heart, as the discovery of America was to Columbus, or the Mississippi to De Soto. I will not here relate all he told me, as to the devices and methods adopted by him for transporting in safety the treasures he had found, from the lake to the seaboard and thence to England. How his face lighted up as he rehearsed the pleasures and triumphs of that season! But it was not all pleasure or unalloyed triumph. For a long while after his return to his native country, he lay at the point of death with an abscess on the liver, the result of his living in the tropics, but his temperate habits, wirey constitution and the unremitting care of his wife, and attention by the best medical skill carried him through safely, and after awhile he was able to take the field again.

I remember, also, upon one occasion, with how much feeling he described the remorse he had experienced, the sense of criminal wrong that oppressed him and made him unhappy for some time, and at many times after, the killing of a female monkey. The poor brute, so human in many of its motions, had at the time a baby monkey in her arms, and the distress of mother and child was so essentially human in its manifestations that he never thought of it without a degree of pain. The monkey was a rare species, particularly desirable for that reason, to complete the collection of either the British Museum or the Zoölogical Society, I have forgotten which, and it was to fill this commission that he committed an act that he afterwards regarded as nearly akin to murder.

Brydges also collected quite largely, specimens of birds, but as my special study in natural history caused me to take greater interest in the molusca, I have better knowledge of the shells he collected than of other forms.

His field work in this connection, included not only the air-breathing or land snails, but also marine and fresh-water species. The peculiar Bulimi of the Atacama desert in Chili, as well as of other portions of the great area included in Peru and adjoining South American States, were obtained by him in great numbers, and one species was named in his honor by the distinguished author Pfeiffer.

The marine shells of the South American Coast from Chili northward to and including the Bay of Panama, yielded a large return to this indefatigable worker.

Brydges afterward made his home in California and resided a part of the time in Oakland and then in San Francisco. It was during this period of his life, that we became acquainted, and I frequently enjoyed the pleasure of his company.

Though of tough and wiry build, he was rather a delicate than strongly framed man. He was of good height and of refined and rather sharp-cut features; his complexion was somewhat dark or sallow, the result, in part, of out-of-door life, and his nearly black hair lay upon his head in short doglocks or half-curls. He was somewhat reticent and diffident in speech and manner, with a quiet, unobtrusive, gentlemanly manner that was quite attractive.

During his residence in San Francisco, and after my acquaintance with him, a natural history expedition to Nicaragua was planned and he left his family and friends in good spirits upon what was destined to be his last excursion. He collected various material in the way of plants, birds, shells, &c.; these came safely to port, but the hand that collected them all had forgotten its cunning and the eye that detected their beauty had lost its power of vision many days before these collections were received.

He died off Acapulco, while on the steamer, upon his return, and his friend Captain Blether, who was in command of the vessel, rendered the last sad service that the living can bestow upon the dead. The tropical fever that before had nearly claimed h m as its victim, finally triumphed, and this ardent lover of Nature and genial companion and friend thus passed away from earth. Instead of being buried at sea as is usual where death occurs so far away from the home of the deceased, and where the disease is of such a character, his friend, Captain Blether, had the remains prepared so as to admit of their being delivered to his family and friends and of sepulture on land. This, as near as I can remember, was in the year 1864, and Brydges was about 55 years of age.

The occurrence of his death, and the service he had rendered to science and mankind, were properly recognized in an appropriate memorial paper by Mr. W. H. Dall before the California Academy of Sciences, and suitable resolutions were adopted on that occasion.

Brydges never published the results of his field work, in fact, never essayed authorship. The information he obtained he freely imparted to others for the public good.

Of the material collected by him in Nicaragua, the shells only passed under my notice. These were in some respects quite important, and included a large number of specimens of several species of fresh-water mussels of the groups Unio and Anodonta. Several of these forms were new and were described by the late Dr. Lea, of Philadelphia. Two fine, large Anodontas were named respectively A. Jewettii and A. Brydgesii, the former for Colonel E. Jewett, another friend, and the latter in honor of the collector, the chief subject of this reminiscence. In moist places, springs and pools upon the forested slopes of Mombacho, he collected fresh-water snails in considerable abundance, principally of the genera Planorbis and Physa.

Of the Brydges' South American, Panama and Nicaraguan collection of shells, ample series of these, now form a part of the Newcombian and Stearns colletcions, and many duplicates have been distributed by me in the course of years, and give increased value to the various collections in this country and Europe, of which they form a part.

In connection with the foregoing, I should mention the exploration by Brydges of the ancient cemeteries or burial places of Chiriqui during his collecting tour in South America. Though not particularly interested in Ethnology, he was curious enough to investigate some of the peculiar dome-shaped graves in which he observed the bodies were plac d in a sitting posture. He obtained many interesting and rare pieces of pottery, earthenware, shaped so much like similar articles found in old Peruvian graves as to indicate that the Chiriquians were of the same racial stock. Some years afterward, these ancient graveyards of Chiriqui, so old that trees of immense size may be seen growing between and out of the graves, suggesting a forest in which the dead were buried, rather than a subsequent sylvan growth, these old graves were ransacked by gold hunters, who were stimulated by an occasional find of quaint whistles and toy-shaped articles of the purest gold. Brydges found earthen articles of the same general character, but, so far as I am aware, none that were made of the precious metal. With a few exceptions, the Chiriqui pottery was purchased after his death by the late Caleb Lyon, of Lyonsdale, N. Y. One piece was given by me to the National Museum and a second is still in my possession and cherished as a souvenir.

R. E. C. Stearns.

A FEW WORDS TO THE YOUNG ORNITHOLOGISTS OF CALIFORNIA.

Having had fair success in collecting wherever I have followed this very pleasant vocation, I will say that whatever success I have had was partly due to skill with a gun, experience in the field, good eyes, but *more than all, to the patient use of field glasses*, with which I selected my birds, usually identifying a bird before I shot it, instead of shooting, as many collectors do, everything that comes within range, and identifying the victims afterward.

The collector should know what to look for and when and where to look for it. The experience of preceding collectors should be studied and also descriptions of unknown birds which are likely to be met with. This adds greatly to the pleasure of collecting.

I have never killed many birds of any one species, almost invariably taking only such as I thought necessary for studying different forms.

Dr. Coues, the distinguished ornithologist, has said in his new key I think, that fifty specimens of each species is not too much for each collection, but to me that number seems a wanton waste of bird life In most cases five or six specimens are enough to put a *good* new species or a good variety on a firm basis, and two or three specimens are usually sufficient for that purpose. Of well established species, a pair, showing the adult male and female spring plumage, is often enough for a private collection, but besides these, the winter and juvenile plumages are usually desirable. In addition to these the moulting stages are in some cases important. Albinistic, Melanistic and other abnormal plumages have little or no scientific value. Possibly, the former results from disease.

To ascertain the value of some local and doubtful forms, a good series is required. Nearly all of our birds which are non-migrants, vary more or less at the extremes of their ranges, and a few local varieties may still be discovered. Accidental visitants may be expected, but new species are not likely to be discovered in California at this late day. In making exchanges, preference should be given to Pacific Coast collectors, for you need a specimen, at least, of each species of our land birds, if not of the water birds also. Do not waste time in exchanging for foreign birds simply because they are pretty. Do not expect to make a fortune by collecting, and, you may as well be indifferent to fame.

If you love nature as you should your reward for making a collection will be ample. You should have examples of all of the West Coast Polioptilas, Vireos, of the three species of Carpodacus, male and female, a good series of the confusing Melospizas, Zonotrichias, and of the Savanna Sparrows, which have been removed from the genus Passerculus to that of Ammodromus. You also need specimens of the three Red-winged Blackbirds, but more especially of the female gubernator and tricolor.

An example, or more, of each of our small Tyrant Flycatchers should be in every collection for the good reason that very few collectors on this Coast can separate them. Specimens of Selasphorus rufa and S. alleni are needed for comparison.

I can safely say there is not a good study collection of bird skins from Bhering Straits to Panama, and such a collection is much needed at some central point, at the California Academy of Sciences, for instance. Try to identify all of your specimens. If you are unable to identify a specimen with an hour, a day, or week of study in connection with it, be not discouraged, for time spent in that way is far from being lost. Half of the pleasure of collecting is derived from the ability to identify from descriptions. With Volume I of California Ornithology you should be able to identify nearly all of our land birds. That is the only work on birds that I possessed for a year or more after I began to collect,

about ten years ago, and during that year or more I correctly identified very nearly all of our land birds, the most of which I had not previously known. Volume ix Pacific Rail Road Reports is still (A. D. 1887) a standard valuable work, having the same descriptions by Prof. Baird, that are found in California Ornithology, Volume 1, but with fuller explanations and comparisons.

The splendid work of Baird, Brewer and Ridgway, in five volumes, contains in the last two volumes, much valuable information concerning Pacific Coast water-birds, from the pen of Dr. J. S. Cooper and others. You should visit all sorts of localities in search of specimens, and do not fail to explore the *denser* forests of the Sierra Nevadas. But little work has been done in the *higher* Sierras, between latitudes 35° and 38°. Mr. Henshaw, of Wheeler's Topographical Surveys, was on and about Mount Whitney in October, 1875 or '76—too late to find all of the summer residents.

With this exception, I know of no one who has collected birds in the higher parts of this region, excepting at its extremities.

If you have never seen the Water Ouzel, and all that that implies, you can well afford to undertake a journey to these mountains. I think this bird does not go as far south as San Diego County. Possibly new species may be found between latitudes 35° and 38°.

You are quite certain to find the rare Syrnium occidentale and the rarer Scops flammeolus, at about 5000 feet altitude.

When you are out moonlight nights looking for these owls, do not forget your field-glass. If a California Lion (Felis concolor) a short distance from you, surprises you with its characteristic screams, make a note of it. You will remember those peculiar screams even if you have a bad memory and an indifferent ear for music; but, as Dr. Merriam in *Mammals of the Adirondacks*, expresses doubt of their screaming at all, you will do well to record some of the circumstances connected with the screams, for example, if your hair "stands on end" say so; or, if otherwise, state otherwise, unless you are entirely bald. If, at the time, you are alone up in a tree, watching a deer lick as well as collecting owls, do not be in a hurry to get down and go to camp if you are a mile or more from it, and the route to it is through the pathless woods with plenty of undergrowth. Any motion on your part might frighten *your* lion away. I can say, in all seriousness, there is no grander excitement than that afforded by collecting alone in a dense forest where large game is abundant. To get the best results, the collector must be silent and listen, and if he is near a deer lick, and on the ground, a position on the lee side of the lick should be selected. This in summer in the Sierras is almost invariably the west side, the wind then blowing, usually, after sunset, from the mountain's top toward the hot San Joaquin and Sacramento Valleys.

The nomenclature of this hastily prepared article may be somewhat *mixea*, as I have not the recent A. O. U. Check List, or any other book by me for reference.

Nov. 20, 1887. *L. Belding.*

CALIFORNIA ROCK SALT.

The regular meeting of the San Francisco Microscopical Society, November 9th, 1887, was well attended; President Ferrer in the chair, and C. P. Bates, Secretary, *pro tem.* Doctor Douglas Montgomery and Doctor Kahn of San Francisco, were elected regular members.

A sample of Mono lake water was handed in by Dr. Mouser, and was referred to Mr. Paysant for the determination of crustaceans living in it.

The paper of the evening was by Mr. Henry G. Hanks of San Francisco, concerning California rock salt, as follows:

Some months ago I received some fine specimens of rock salt from Mr. J. S. Cook of San Bernardino County, which I found very interesting, and at the same time I was impressed with the importance of such salt to our State and to the Pacific Coast. But press of other business caused me to lay the matter aside for future consideration. Lately my attention has again been called to this very interesting subject, and I have discovered certain peculiarities in the mineral that I trust will be as interesting to the members of this society as they have proved to me.

Like the very best quality of rock salt, this mineral occurs in blocks of the utmost transparency. It is quite easy to read printing through a cube several inches in thickness. Some pieces are as clear, colorless and free from mechanical impurities as ice from distilled water, frozen in a vessel of porcelain. Others contain some foreign matter which does not enter into the composition of the salt. When dissolved and filtered the solution is perfectly colorless, and on applying the usual chemical tests, without observing sufficient care to detect minute traces, the salt is found to be almost absolutely pure. The fact that in a somewhat moist atmosphere it does not deliquesce is an additional proof of its chemical purity.

Some pieces transparent and colorless, melt at a red heat on platinum foil without decrepitation to a transparent and also colorless fluid, which retains its transparency when cooled.

Other specimens show faintly opalescent lines meeting each other at right angles. If such a specimen is held at a certain angle in the sunlight, a multitude of reflecting surfaces like imbedded spangles may be seen which glimmer something like aventurine, or glow like a sun-stone. It may also be seen that while the faint lines meet at right angles, a dividing line forms a miter like the corner of a door panel. Such a specimen, when heated to

redness, explodes with great violence, so much so, that the experiment is one of considerable danger if the eyes are not protected from the minute flying cubes into which the larger one is broken by the explosion.

On obtaining these very interesting results, I naturally appealed to the microscope, our favorite instrument, for the cause of the violent decrepitation, in one case, and quiet fusion in the other. Nor did I seek in vain, as I hope to be able to show you this evening. I found the phantom lines and reflecting spangles to be minute cavities in the anhydrous salt, all of the same general form but varying in size from those so minute as to be scarcely visible under a two-thirds objective, to others that can be examined in detail. The cavities are box-shaped, mostly square but sometimes slightly oblong. They are generally from four to six times as broad as they are deep. All the angles are rounded, and all the lines marking the sides of the cavities curved, just as we saw others some months ago while examining the beautiful diamond from Amador. Both these minerals crystallize in the same system.

All the imbedded cavities are empty. You may search them over and not see a particle of inclosed matter. But on the surface, where the walls are broken down, they may be seen partly filled with the debris of the crushed salt, which proves that they are actually cavities and not illusory.

It having been proved that the salt contains only traces of water, it may be inferred that the cavities are filled with a gas or with atmospheric air. Otherwise it would be difficult to account for the explosion when heated. On examining the salt after heating, it was found that the transparency was not materially impaired, except at those points where the box-like cavities were shattered by the escaping air under pressure. They had lost their beautiful form and had become irregular, roughly globular cavities, filled with broken fragments of salt. In every direction from the shattered cavities the substance was fissured and fractured, showing the great force exerted by the escaping gas or air. It is a mystery how these beautiful cavities could be formed in so hard and anhydrous a substance as rock salt.

After actual food and water, salt is one of the most necessary requirements of man and animals, and it is a question if a healthy bodily condition could be long maintained without it. Salt is also largely employed in manufactures and the arts.

Rock salt is not always so pure as the specimens shown you this evening. In England it is colored red by the oxide of iron it contains. It is also sometimes contaminated by clay and sand, and often by imbedded associate minerals, as gypsum, anhydrite, borax, glauberite and others; still it is seldom, if ever, so impure as salt made from seawater, for which reason it commands a higher price. It dissolves more slowly than the more impure varie-

ties, which property fits it for certain purposes and uses in the arts. Pure salt does not deliquesce except in a very moist atmosphere.

Salt obtained artificially contains various impurities which impair its value. These impurities are generally magnesia, gypsum, bromine and iodine, with much organic matter, while rock salt is free from them. This has led to the theory that seawater takes its salt from beds of rock salt, instead of rock salt being deposited from the ocean This theory is strengthened by the fact that rock salt is sometimes absolutely anhydrous.

While inferior salt may be extracted from brines found in nearly all countries, rock salt is rather rare. It occurs in very large deposits in England, Poland, Hungary and Germany. In the high mountains of Chili it is met with at an elevation of 9000 feet above the sea level. In Spain, 16 leagues from Barcelona, there is a mountain of salt three miles in circumference and 500 feet high. It is quite pure. No gypsum is found with it. This mineral has been found also in considerable quantities in New South Wales.

It has long been known that rock salt existed in very large quantities in Nevada and Arizona. On Holt's map of California and Nevada, published in 1876, a deposit in Lincoln County, Nevada, is described as being five miles long and 600 feet high. This locality lies 53 miles, by the scale of the map, a little west of north from Callville, on the great bend of the Colorado river. Some years ago I examined specimens and found them to be very pure.

In Cleveland's "Mineralogy," published in 1816, I find a statement that, "rock salt is found in California in very solid masses." The writer probably referred to the peninsula of Lower California.

In the sink of the Colorado desert in San Diego County, deposits of salt have been discovered, and are rather extensively worked, but this salt is probably the result of the evaporation of the waters of an ancient inland sea, cut off from the great ocean by the delta of the Colorado river, or by an upheaval of land, gradual or otherwise. The water, under the influence of the sun and the dry climate of the locality, became less until a resulting small lake of concentrated sea-water finally dried and left the deposit of salt. This is a good theory until a more thorough study of the deposit is made. It is now covered by silt and debris washed down over it during many winters of rain-storm and cloud-burst.

The associate minerals often found with rock salt have also great value. Chloride of potassium in very large quantities is extracted from beds overlying the salt deposits at Stassfurt, in Saxony. Some idea of the quantity may be inferred, when the statement is made, that, in 1863–64, 400 tons of carnallite were raised. The yield increased annually until 1875, when the pro-

duction was 494,414 tons. Carnallite contains theoretically 26.88 per cent. of chloride of potassium.

If a deposit of this character should be discovered in connection with one of our great salt deposits, its importance to California and the Pacific Coast can scarcely be estimated.

Mr. Hanks illustrated his essay with specimens which were examined under the microscope, and found to bear out well the descriptions in the paper. The study of the specimens led to an interesting discussion of the subject.

Among the donations to the society's material, were two specimens of diatomaceous earth from William Irelan, Jr., State Mineralogist. One was impregnated with asphalt, and was from the mouth of Dos Pueblos creek, near Naples, in Santa Barbara County, and the other was from Shasta County. The specimens were referred to Mr. Riedy and Dr. Riehl for examination and report.

Edward J. Wickson, Recording Secretary.

A SHARP FAMILY—THE CACTUSES.—I.

The cactus family contains many of the most singular and grotesque productions of the vegetable world. The flowers of many are of the most gorgeous coloring; of others, the most delicate and beautiful known either to botanists or horticulturists. There is no end to the varied and striking forms of these plants, which Baron von Humboldt declared to be 'as characteristic of the new world as the heaths are of the old.' Some possess slender, graceful stems; others resemble a load of cord-word hastily thrown from a wagon—distorted in form, coarse and awkward in habit. The Cereus giganteus, Engelm, has a diameter frequently of three or four feet, towering to a height of thirty to sixty feet, sending out branches or high 'elbows'—rising like a huge candelabra from the sands of the desert regions where it abounds. The pretty little Mamillaria micromeris, is a top-shaped plant, three-quarters of an inch in height and half an inch in diameter, covered with a delicate lace-work that would be worthy of credit even from fairy fingers.

The larger portion of the species are found in exposed situations in countries where no rain falls for months at a time—in the most arid and desert portions of America, springing from crevices in the rocks, from the sands, or from soil otherwise barren or seemingly sterile.

The family is characterized by the late Dr. Engelmann, in the Botany of California, as follows: 'Green, fleshy and thickened, persistent, mostly leafless plants, of peculiar aspect; globular or columnar, tuberculated or ribbed, or jointed and often flattened, usually armed with bundles of spines from the 'areolæ', which constitute the axils of the (mostly absent) leaves. Flowers with

numerous sepals, petals, and stamens, usually in many series, the cohering bases of all of which coat the inferior one-celled many-ovaled ovary, and above it form a tube or cup, nectariferous at base. Style 1, with several or numerous stigmas. Fruit a pulpy or rarely dry one-celled berry, with numerous campylotropous seeds (without or with some albumen), on several parietal placentæ.'

There are but few genera in the family, but over a thousand species are known, and new ones are being continually discovered in little known portions of this continent. The late Dr. George Engelmann, of St. Louis, Mo., has been the leading American student and author, and to him the world owes the most of its literature pertaining to this order.

It is the author's purpose to compile from various sources in this article, adding from his own notes, such matter as may be of popular interest, or as yet unrecorded. The collection of living cactuses in the Shaw Botanic Gardens, St. Louis, Mo., is the most important collection to a botanist in the United States. The collection of A. Blanc, Philadelphia, is the largest private collection, while thet hird largest collection, in this country, is that of about five hundred varieties, lately sold to the Coronado Beach Co., of San Diego, by the writer, and now planted (in part) in one of the parks on Coronado Beach. Several new species as yet undescribed are in the writer's private collection and herbarium.

ANHALONIUM, ENGELMANN.

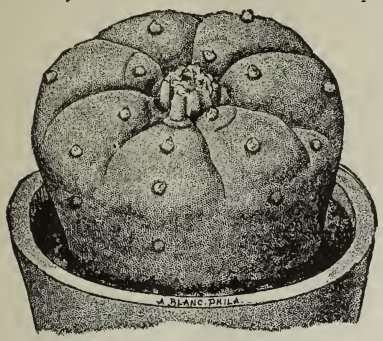
The plants of this curious genus are simple, tuberculated and spineless; the tubercles subfoliaceous, triangular and more or less groved. Flowers senile above the axis of the present year's growth, medium sized, white, pink or rose colored. Seeds large,

ANHALONIUM FISSURATUM. ENGELM.

black and tuberculated.

Anhalonium fissuratum, Engelm. Cact , Mex. Boun. 75, is found on limestone hills along the Rio Grande, and is considered rare. The lower part top-shaped, the upper scarcely projecting from the ground, two to four inches in diameter, hemispherical or depressed and flattened, with five to eight rows of spirally arranged tubercles. Flowers central, an inch in diameter, petals rose or pink, stamens white, with orange-colored anthers.

A. prismaticum, Sem., from the mountains in Mexico, is a beautiful species, 6 to 12 inches in diameter, pale glaucous green, the top surmounted with a dense wooly tuft. Tubercles in spirals, triangular, ¼ to 1 inch broad, 1 to 1½ inches long, terminating in an acute, terete point. Flowers large, petals in four rows, silvery-white, stamens white or pale canary, anthers bright orange.



A. WILLIAMSII, NEBER.

A. Williamsii, Neber, from the plains of Texas and northeastern Mexico, is a singular plant, unsought by those who desire only the beautiful in Nature. This unique and rare plant is not unlike a carrot in shape, 2½ inches in diameter by 6 inches in height, of a dark glaucous green, the top depressed and irregularly furrowed. Flowers pale rose or flesh-color.

C. R. Orcutt.

NOTES AND NEWS.

Papilio Rutulus.—A new variety of this, from Nevada, is named in the *Canadian Entomologist*, for October, by James Behrens, after its discoverer, Herr V Ammon, of San Francisco.

Catocola Elda.—This is a new species, found at Portland, Oregon, and also named by James Behrens in the *Canadian Entomologist* for October.

A. H. Breckenfeld.—The San Francisco Microscopical Society loses an able recording secretary by the resignation of this gentleman, to whom this and many other journals have been indebted for regular reports of the proceedings at the semi-monthly meetings of this society. San Diego, we understand, is to gain what San Francisco has lost, as Mr. Breckenfeld intends to reside here in the future.

The large autograph collection of the late Ben. Perley Poore, will be sold at auction this winter in Boston.

A FEW COMMON MINERALS AND ROCKS.

NAMES HARDNESS.	COLOR.	FROM.	WITH ACIDS.	CLEAVAGE.	REMARKS.
Limestone (r) soft	All colors	Massive	Effervesces	None	Marble is pure limestone.
Calcite (m) "	" "	Rhombohedral	"	3 directions, perfect	White veins in limestone.
Sandstone (r) hard	" "	Massive	None	None	Grains of sand visible.
Quartz (m) "	" "	Hex. crystals	"	"	Cuts glass readily.
Shales (r) soft	" "	Massive	"	Parallel to bed	A common rock.
Schists (r) hard	" "	"	"	" " "	Slate of coal.
Slates (r) "	" "	"	"	Perpendicular to bed	Roofing slate.
Granites (r) "	" "	"	"	None	Contain quartz, mica and feldspar.
Feldspars (m) hard	" "	"	"	2 directions	Twice as hard as marble.
Micas (m) soft	" " colorless	Thin leaves	"	1 direction	Isinglass of stoves.
Pyrites (m) hard	Yellow	Massive and cubical	"	None	Fool's gold.
Limonite (m) "	Earthy	Massive	"	"	'Iron ore.'

NOTE—Minerals consist of one material; rocks of several. A specimen which will scratch glass is considered hard All others are soft. r=rock; m=mineral.

G. G. Groff.

TO FIND THE CAPACITY OF WATER-TANKS.

Containing vessels are usually made in the form the frustum of a cone. Tubs and pails, kits and tanks, pans and coffee-pots, all have the same general form, and are measured by the same general rules.

Especially in this country, where so many tanks are annually built, is the frustum of a cone seen on a grand scale. These tanks are usually set on a high tower, and are supplied with water pumped by a windmill. They are made of clear redwood lumber, and are strongly hooped with iron. When properly built they are water-tight, and they resist decay for many years. The top is several inches smaller than the bottom, to allow the hoops to bind firmly when they are driven downward.

Owing to their circular and tapering form, it is not so easy to calculate their capacity as it would be to find that of an ordinary box or bin. The rule of the arithmetics for finding the volume of the frustum of a cone is quite complex, and involves finding the area of two circles, the square root of the product of these areas, and other minor operations.

An examination of the principles involved has enabled me to deduce the following simple rule, which I trust will be found useful by all who have occasion to measure anything which has the form of the frustum of a cone. Even a barrel or cask may be considered as two tubs joined together, and the calculation will vary but little from the true capacity of the cask.

The following directions and rule should be observed:

Measure the inside radius, (half the distance across), both of the top and of the bottom of the tank or tub, and also find its perpendicular depth. Reduce the measurements to inches.

Multiply each radius by itself, and one radius by the other.

Add the three products and multiply their sum by the depth.

Multiply this product by the decimal .0045⅓, and the result is the capacity of the tank in gallons and decimals of a gallon.

For example: A tank measures 4 feet and 6 inches across the top, 5 feet and 4 inches across the bottom, and is 4 feet and 2 inches deep; how many gallons will it contain.

OPERATION.

Smaller radius=27 inches.
Larger radius=32 inches.
Depth=50 inches.

$27 \times 27 = 729$
$32 \times 32 = 1024$
$27 \times 32 = 864$

Total=2617
$2617 \times 50 = 130850$
$130850 \times .0045\frac{1}{3} = 593.1867$, Answer.

The capacity of the tank is therefore a little over five hundred and ninety-three gallons.

Take another. A milk-pan is 14 inches across the top, 10 inches across the bottom, and 3 inches deep; how many quarts will it contain?

$7 \times 7 = 49$
$5 \times 5 = 25$
$7 \times 5 = 35$
109
$109 \times 3 = 327$
$327 \times .0045\frac{1}{3} = 1.4824 = $ No. of gals.
$1.4824 \times 4 = 5.9296 = $ No. of qts.

Hence the pan will hold nearly six quarts of milk. If the result is desired in cubic inches it may easily be obtained by multiplying the number of gallons by 231.

A knowledge of the actual capacity of tanks is often very desirable, and in this easy way mere guesses may be verified, and disputes may be settled.

Should any of my young friends, who are mathematically inclined, be unable to find the reasons for this short rule, I shall be pleased to correspond with them.

Josiah Keep,
Mills' College, Cal.

DESCRIPTION OF A NEW HEMILENCA.

Hemilenca Californica, n. s. Expanse, ♂, 2.40—2.50; ♀, 2.85—2.90.

Head, black. Antennæ; ♂, stem, brown, pectinations black; ♀, wholly brown.

Prothorax, white. Patagia, white in front, overlaying longer hairs of white and black.

Thorax, black, with tufts of rust-red hairs behind the patagia.

Abdomen, black, with a few scattered white hairs toward anal end, and with white or sometimes yellow hairs in segmental spots on sides beneath; ♂ with large anal tuft of rust-red hairs, ♀ without red tuft, but tip is hoary with short hairs of sordid white.

Legs, femoral with long, red and black hairs; tibiæ, with fewer hairs of black and white.

Wings, above and beneath the same; costa, dense black to apex, base, dense black becoming thinner, outer margin black, sub-diaphanous, intermediate portion white, sub-diaphanous. When quite fresh, the wings are clear white and black, and rather opaque, but, with exposure, become sordid, yellowish and more diaphanous. Veins, all are honey-color.

Discal spots, thin, black, touching costa, but separated from black base, and yet more widely from dark margin; at the cross-vein, in its center, is the lunule, narrow, obtusely angled, the an-

gle clean cut and pointing toward the head. Discal spots on secondaries, small, black, never with any lunule or central mark whatever.

Habitat, Southern California.

Types in Author's Museum.

This species has been heretofore run in with H. Nevadensis, Stretch, but must be separated because of the red tufts on thorax, the white spots on abdomen beneath, the color of the nervules across dark margin, the angled lunules on secondaries, in all of which the differences are persistent and without intergrades. Indeed, there appears to be as great a difference between H. Californica and Nevadensis, as between Nevadensis and the Eastern Maia. *W. G. Wright.*

San Bernardino, Cal.

THE TROUSLOT COLLECTION.

R. B. Trouslot & Co., late publishers of *The Hoosier Naturalist*, have recently made large additions to their private oölogical cabinets, by the purchase, through Frank H. Lattin, of the larger part of J. C. Maynard's collection, all of Harry G. Parker's collection, all of F. M. Carryl's collection, together with large lots from other collections from all parts of the United States. There were also two large boxes of foreign eggs.

These are being listed, and all duplicates not desirable for their collection will be placed on the market.

They also secured many large and showy shells, corals, curiosities, etc., for their museum.

There was an immense slab of bark from one of the mammoth California trees. Recent protective laws relative to the preservation of these wonderful trees, will tend to make their bark exceedingly rare. It is undoubtedly the largest single chunk ever carried east.

They anticipate also securing the only known set of eggs and nest of the Bahama Cuckoo. This set was collected by J. C. Maynard, and is figured in his 'Birds of the Bahamas.'

The entire purchase aggregated $3350.00.

Messrs. Trouslot & Co. can be congratulated on securing so complete a series of North American eggs, which will be of great assistance to our associate editor, R. B. Trouslot, the head of the firm, in connection with his departments of ornithology and oölogy.

We received a pleasant call recently from Dr. H. Mayr, of the Bavarian Forest School, with his bride, who spent a day at San Diego while on their way to Japan. Dr. Mayr has been appointed to the professorship of botany in the University of Tokio.

AGASSIZ ASSOCIATION, SAN JACINTO, SAN DIEGO COUNTY, CALIFORNIA.

PUBLIC SCHOOL. Nov. 4, 1887.—After the calling to order, and other routine business had been transacted, the President called upon each member in succession to bring his contribution to the day's exercises. Each member, as his name was called, exhibited a mounted insect specimen, collected, classified and labeled by himself since the last meeting. Each of these specimens was accompanied by a short essay, explaining and classifying the specimen, giving in many cases detailed drawings of the insect as a whole and of its parts. These essays were all written upon uniform paper, and were preserved by the Curator for future reference. Many of the members also made large blackboard drawings with colored chalks to illustrate their essays. Some of the exercises were as follows: Milton Bates brought in a specimen of beetle and made a large drawing of its leg, showing the scientific name and use of each part. Minnie Cree read an essay, calling attention to the value and attractiveness of Entomology, illustrated by a blackboard full of large drawings showing a typical insect in the larva form, the pupa form, and in its final perfect condition, a beautiful butterfly. Maud McCormick presented a fine specimen of wood borer with drawings on blackboard and paper. Charley Stoddard's specimen was a grasshopper, very neatly drawn on paper in different positions, with detailed drawings of its parts. Thomas Fairchild showed a large green tomato worm—then exhibited the same in its pupa form—and finally called attention to a blackboard drawing, several feet square, of a magnificent moth, the perfect form of the same insect. This was considered to be the finest drawing of the day. William Russell brought in and exhibited to the society a series of comic drawings of grasshoppers, that excited much merriment. Miguel Estudillo brought in a butterfly, and created a great deal of amusement by describing the adventures that befell him while capturing it. Mr. Hyatt gave a short lecture, showing the difference between good specimens and bad ones, and explaining in detail the four forms of insect life. Mary Anderson explained the difference between butterflies and moths, and showed drawings of the scales on the wings of butterflies. Fichie Foot, Carrie Clark and Minnie Todd sang a song about the charms of "Gathering up the bugs from the green fields." The secretary's table, at the close of the meeting, showed a remarkable collection of insects to have been made in one place within the space of three days. Every one of the orders of insect life was represented. More than 250 specimens, belonging to more than 25 different species were there. The number of species from each order was as follows: Hymenoptera 4, Lepidoptera 9, Diptera 2, Hemiptera 3, Coleoptera 1, Orthoptera 5, Neuroptera 1. The society was assisted in making its collection by several mem-

bers of the Intermediate departments, especially Una Atwood, Willie Cresmer, Albert Reinhardt and Ernest Jenkins.

Carrie Bates, Secretary.

Dr. Asa Gray, the renowned botanist, was reported December 10th as very ill, and was not expected to live till morning. We hope to hear better news.

THE ORIGIN OF SALT.

This world was once a haze of fluid light, as the poets and the men of science agree in informing us. As soon as it began to cool down a little, the heavier materials sank toward the center, while the lighter, now represented by the ocean and the atmosphere, floated in a gaseous condition on the outside. But the great envelope of vapor thus produced did not consist merely of the constituents of the air and water; many other gases and vapors mingled with them, as they still do to a far less extent in our existing atmosphere. By and by, as the cooling and condensing process continued, the water settled down from the condition of steam into one of a liquid at a dull red heat. As it condensed it carried down with it a great many other substances, held in solution, whose component elements had previously existed in the primitive gaseous atmosphere. Thus the early ocean which covered the whole earth was in all probability not only very salt, but also very thick with other mineral matters close up to the point of saturation. It was full of lime and raw flints and sulphates and many other miscellaneous bodies. Moreover, it was not only just as salt as at the present day, but even a great deal salter. For from that time to this evaporation has been constantly going on in certain shallow, isolated areas, laying down great beds of gypsum and then of salt, which still remain in the solid condition, while the water has happened in a slightly different way with the lime and flint which have been separated from the water chiefly by living animals, and afterwards deposited on the bottom of the ocean in immense layers, as limestone, chalk, sandstone and clay. Thus it turns out that in the end all our sources of salt supply are alike ultimately derived from the briny ocean. Whether we dig it out as solid rock salt from the open quarries of the Punjab, or pumped up from brine wells sunk into the triassic rocks of Cheshire, or evaporate it direct in the salt pans of England and the shallow salines of the Mediterranean shore, it is still at bottom essentially sea salt. However distant the connection may seem, our salt is always in the last resort obtained from the material held in solution in some ancient or modern sea. Even the saline springs of Canada, and the northern states of America, where the wapita love to congregate, and the noble hunter lurks in the thicket to

murder them unperceived, derive their saltness, as an able Canadian geologist has shown, from the thinly scattered salts still retained among the sediment of that very archaic sea whose precipitates form the earliest known life-bearing rocks. To the Homeric Greek, as to Mr. Dick Swiveller, the ocean was always the briny; to modern science, on the other hand (which neither of those worthies would probably have appreciated at its own valuation), the briny is always the oceanic. The fossil food which we find to-day on all our dinner tables, dates back its origin primarily to the first seas that ever covered the surface of our planet, and secondarily to the great rock deposits of the dried up triassic inland sea. And yet even our men of science habitually described that ancient mineral as common salt.—*Cornhill Magazine.*

HOW THE PLATYPUS BREEDS.

This question is now satisfactorily settled. The platypus lays eggs, and Mr. Caldwell, Natural History Fellow of Caius College, Cambridge, has been credited with the honor of the discovery. Mr. Caldwell, though not responsible to any scientific body in this country, was nevertheless good enough to appear before the members of the Linnean Society of Sidney, and verify his discovery. He exhibited the eggshells, made a statement, and answered all questions put to him. The eggs were round rather than oval, the shells hard and of a calcareous composition. Mr. Caldwell dissected over 600 female specimens before getting one with an egg in it. The female in which the egg was found had layed an egg just shortly before she was caught, and the embryologist, who had suffered so many disappointments from a similar cause, feared that he was to be again doomed to disappointment; but such, however, was not the case, for on dissection another egg was found, and then, and not till then, was this vexed question decided. It is no exaggeration to say that this is one of the most notable scientific discoveries of the nineteenth century. Students to the philosophy of Darwin are quite alive to the importance of this discovery, and it has been hailed with delight by Professor Mosely and many other eminent scientists. The platypus (Ornithorhynchus) has bridged the hiatus that hitherto existed between birds and animals; in other words, the most important of Darwin's "missing links" has been discovered, and the chain of connection between reptiles and man is now very nearly complete. Much credit is due Professor Liversidge, of the Sydney University, for the promptitude with which he cabled the discovery to the Royal Society, then sitting at Montreal; and I am personally much indebted to that gentleman for kindness in furnishing me with Mr. Caldwell's address and forwarding him my letters. I shall be very thankful to your correspondent, "Platypus," if he will forward me those spirit specimens of platypus eggs to the Australian

Museum, Sydney. During my absence from Sydney, Mr. Ramsey has kindly promised to take charge of all specimens that may arrive for me at the museum.—*Australian Exchange.*

[The platypus, commonly known as the duck-bill, is found in Van Dieman's Land and Australia. In its bill-like jaws, its spurs, its monotrematous character, its non-placental development, and its anatomy, it appears to be a connecting link between birds and animals.—*Editor.*]

THE RESURRECTION PLANT.

This singular plant is really one of the wonders of creation Imagine a bunch of withered looking, curled up shoots, brown, stiff, and apparently dead, resembling a bird's nest. Place it in water, in half an hour what a transformation! The withered looking bunch has now opened and is transformed into a lovely patch of moss, entirely covering an ordinary plate. In its native habitat, when the dry season sets in, the plant curls up into a round ball and is wafted away by winds from place to place, sometimes for hundreds of miles, when at last it reaches a moist spot it gradually unfolds itself, makes new roots and thrives in its new found home. This sensitiveness to moisture is so great that even after the plant may seem dead it will open and close as if it were alive. *F. M. Gilham's Catalogue.*

Washington, D. C., was made the capital of the United States July 8th, 1792.

ABORIGINAL FISH-HOOKS.

BY STEPHEN BOWERS, PH. D.

Four years ago the writer contributed an article which was published in *Science* on pre-historic fish-hooks, which he believes to have been the first description of the true aboriginal fish-hooks from this section of the country. Many of the specimens figured and described as "fish-hooks" are, doubtless, nothing more nor less than ornaments which were worn in the ears of the natives. This is true of Fig. 1, and possibly Fig. 2. The first was manufactured from haliotis shell, and the cut is the size of the original, which is true of all the specimens figured in this paper.

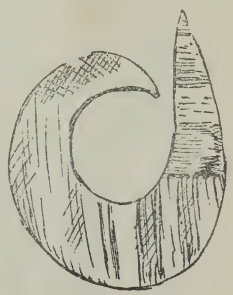


Figure 1.

It will be observed that the point of the specimen first figured comes so near the shank that when the end of the line was looped upon it and cemented with asphaltum, which was universally the case, the space would be filled, and certainly it would be out of the question to hook it into the mouth of a fish.

This may also be argued against Fig. 2. But from the fact that the latter specimen contains a barb, some archæologists claim that it is a fish-hook. Yet it is by no means clear to my mind that it was designed for anything but an ornament for the person.

Figure 2.

The true fish-hook, of what is known as the Santa Barbara stock of Indians, is represented in figures 3 and 4, and was manufactured from bone. Two slightly curved and doubly pointed pieces of bone were tied together at one end, the larger piece being used for the shank on which the line was fastened, and the shorter piece to pierce the mouth of the fish. Its form is similar to that still in use by the South-sea Islanders and manufactured from the shell of the pearl oyster.

Figure 5 represents a metal fish-hook which the writer found in an Indian grave on the Conejo plateau, in this (Ventura) county. The shank was fastened into an olivella shell which had been notched as represented in the engraving. The shell was, doubtless, designed to attract by its glistening and shiny appearance. The specimen is somewhat restored

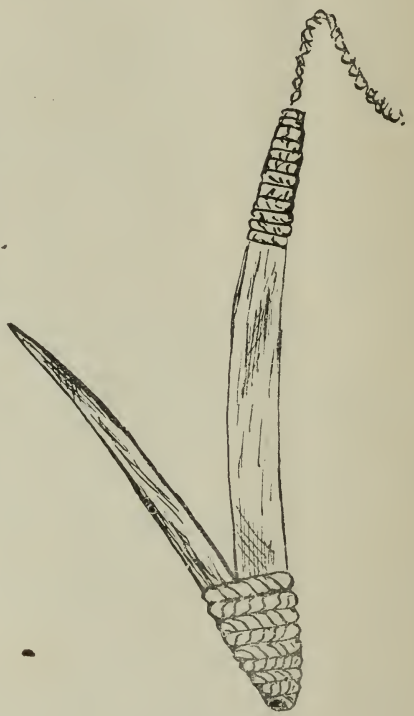


Figure 3.

in the cut, the original having been eaten with rust, but is still sufficiently perfect to show the outline and character of the implement.

Figure 4.

On San Miguel Island, and in other places in this section, the writer has found the rude tools by which ornaments like Fig. 1 were made, and the specimens in various stages of development. The study of this kind of aboriginal work is invested with much interest.

Figure 5.

A seventy-five barrel oil well has just been struck in the Adams canon in Ventura County, by the Stuart & Hardison Oil Company. The wells are now producing about 300 barrels daily. The company has about 80 miles of pipe-line carrying oil.

A COLLECTING TRIP.

On June third, of last year, the writer arrived at Donner, Placer County, Cal., for a short collecting trip among the birds which breed on the high Sierra. The altitude at the Summit is about seven thousand feet, and when I arrived, there was still in places considerable snow. The Mountain Chickadee (Parus Montanis) is a common bird both but at Summit and at Blue Canyon. At half the elevation, where I stopped over one day, I found two of their nests at Blue Canyon, both of which contained youug. The first one was in a natural hole in a dead and fallen tree, only two feet above ground. The nest was discovered by seeing the hole, and then I found it well nigh impossible to get her out again, for she resisted my efforts to frighten her from the nest with all the pertinacity of the species.

The other nest was in a decayed stump and only about three inches above the ground. Both nests were of wool and other soft materials. During my stay in the mountains I found three nests of the rare white-headed Woodpecker (Xenopicus albolarvatus). The first set was taken at Blue Canyon, and was in a dead stump about eight feet above ground. It contained four eggs, with incubation commenced. The hole was about nine inches deep by four inches wide. The other two nests were found at the Summit, and each had three fresh eggs. The holes were excavated in dead stumps about as high up from the ground as the first, and their dimensions were about the same. The difference in sizes of the eggs of the several sets was very noticeable, but I am not at this writing prepared to give the measurements. A nest of the white-crowned Sparrow (Zonotrichia Cucophrys) with three eggs, I found on the ground near a stream of water. It was built of dry grass and placed at the base of a clump of small willow trees. The nests of the Western Robin (Merula migratoria propinqua) and Blue-fronted Jay (Cyanocitta stellari frontalis), are often found built in the snow sheds.

H. R. Taylor.

THE HOOSIER NATURALIST.

Mr. Lamson, of Valparaiso, Indiana, has received the permission of the proprietor of THE WEST AMERICAN SCIENTIST to issue from that place a new monthly magazine as a continuation, and under the old name, of *The Hoosier Naturalist*, a magazine formerly published by R. B. Trouslot & Co., who sold to the editor of this magazine the entire right and good will of his publication last July. We wish the new venture success, and trust that the news of the revival, under the old name but under new management, will be received with pleasnre by our readers, especially those who know *The Hoosier Naturalist* of old. R. B. Trouslot, the former editor, will probably assist on the new journal, but will continue his connection with this magazine.

Editor.

EDITORIAL.

A Merry Christmas and a Happy New Year to all our friends—our readers. In entering upon a fourth volume the prospects seem brighter than ever before, and we have to thank the many who have assisted us so liberally in the past for this pleasant state of affairs. We hope to continue deserving, in their eyes, of their contributions and good will in the future.

We are especially indebted to Dr. C. C. Parry for editorial assistance the past few months, at a time when we were fully occupied with other work. Professors Josiah Keep, E. L. Greene, R. E. C. Stearns and L. Belding are among others to whom we owe at least this acknowledgment.

Through the courtesy of the International Co. of Mexico, we recently paid a short visit to Todos Santos and San Quintin bays, Lower California. We left San Diego on the little steamer, 'Carlos Pacheco'. the evening of November 14th, and arrived at Ensenada, on Todos Santos bay, the next morning, having had a very smooth passage. The next day we spent in search of a large tree of Rhus integrifolia, Nutt., there locally known as the 'Mahogany tree' on account of the dark rich color of the wood. Large fields were found on the San Carlos mesas and on the 'Maneadero', covered with a luxurious growth of this tree, and many were found from one to two and one-half feet in diameter. These trees were seldom found over twenty feet in height, the trunks rarely over four to six feet in height, and of probably a thousand and more that were examined not one was found free of branches on its trunk for a space of five feet, many branching out from near the ground.

The low oval bushes of Simmondsia Californica were seen everywhere on the San Carlos mesas and on the 'Maneadero,' about ten miles south of Ensenada, on Todos Santos bay. The young, fresh leaves are of a dull glacous green, but all the older—more

mature foliage upon the bushes had turned to a brilliant orange—forming a most pleasing feature in the landscape, when viewed at a little distance at a season when flowers were rare. In the spring these same plains are clothed with gorgeous beds of blue Phacelias, various white and yellow flowers, and especially brilliant with the golden Eschscholtzia, and it was a pleasant surprise to find them brilliant in the fall with the equally showy foliage of this shrub.

The other botanical aspects of the San Carlos mesas at this season were not of great interest, but a few particulars are worthy of note. Aplopappus orcuttii, Gray, was abundant (its original locality), but nearly done blossoming. Artemisia Californica, Eriogonum fasciculatum, Ephedra Californica (frequently covered with a dense growth of a fungus, peculiar to it), and occasional groves of the 'Mahogany tree,' formed the principal vegetation, except along the banks of little arroyos leading down from the hills. Occasional clusters of cactus, buckeyes, Rhus laurina, etc., were seen, while along a ravine 'yerba santa' (Eriodictyon) was seen growing, and near it, a straggler or two from the hills of the Guadaloupe Island, Cypress; and other shrubs and bushes, the flowering ash, mock willow, etc.

On the San Carlos bluff, overlooking the 'Maneadero,' I found several large groups of a new species of Cereus, known to the Mexicans as *cochal*, which I had found eighteen months before near San Quintin bay, in great abundance, which I hope to publish later. One little Saxifraga Parryi, Torr., in bloom on this mesa, should not escape notice.

Returning to Ensenada on the 18th, I was in season to take the larger steamer 'Whitelaw' to San Quintin, where we arrived the following morning at 7 o'clock. Right at the nearly completed wharf, a rich bonanza awaited me. An exposure of a large deposit of fossil shells was found, extending for nearly a mile on either hand. The character of the bed is similar to that exposed at several points on San Diego bay, showing that their age must be nearly the same. The species found were mainly identical with those found in the beds at San Diego, with the addition of a considerable number of more southern forms. In several places, across the bay especially, were found places where the stratum was composed principally of what I consider to be Turritella Cooperi. On the other side of the bay the fossils were found lying on a bed of lava to which the oyster and some other shells were attached, while numerous broken fragments and pebbles of lava were mixed in with the shells. Above all loomed up the two silent craters which had belched forth the huge mass of lava doubtless before even the tops of the volcanos had risen above the ocean wave. In the east stands the highest mountain in the peninsula, variously credited with an altitude of 11,000 to 13,000 feet, as yet a *terra incognita* to the naturalist.

AMONG THE MAGAZINES.

Except the life of Lincoln and the War Articles, no more important series has ever been undertaken by *The Century* than this of Mr. Kennan's. With the previous preparation of four year's travel and study in Russia and Siberia, the author undertook a journey of 15,000 miles for the special investigation here required. An introduction from the Russian Minister of the Interior admitted him to the principal mines and prisons, where he became acquainted with some three hundred State exiles,—Liberals, Nihilists, and others,—and the series will be a startling as well as accurate revelation of the exile system. The many illustrations by the artist and photographer, Mr. George A. Frost, who accompanied the author, will add greatly to the value of the articles, which will appear in the current volume.

ST. NICHOLAS, *For Young Folks.*—Since its first issue, in 1873, it has maintained, with undisputed recognition, the position it took at the beginning,—that of being the most excellent juvenile periodical ever printed. The best known names in literature were on its list of contributors from the start,—Bryant, Longfellow, Thomas Hughes, George MacDonald, Bret Harte, Bayard Taylor, Frances Hodgson Burnett, James T. Fields, John G. Whittier; indeed the list is so long that it would be easier to tell the few authors of note who have *not* contributed to "the world's child magazine."

One of the best home magazines published is *The Cottage Hearth*, of 11 Bromfield St., Boston, and its subscription price of $1.50 a year is very low for so beautifully printed and illustrated 32 page quarto monthly, and yet, by special arrangement with its liberal publishers, we can send both *The Cottage Hearth* and THE WEST AMERICAN SCIENTIST one year for only one dollar and a half—the price of one! Further, sample copies will be sent free to any of our readers who may address the publisher as above.

A GLANCE AT BOOKS.

Among the interesting volumes from the publishing house of Messrs. Lee and Shepard, Boston, are 'The Fortunes of the Faradays,' by Miss Douglas; 'The Art of Projecting,' by Prof. A. E. Dolbear, the inventor of the telephone, who mentions especially the electric lamps and lights for projecting purposes, and phenomena of vortex rings; 'The Debater's Handbook,' which includes Sheridan Knowles's debate on the character of Julius Cæsar; 'Britons and Muscovites,' by Curtis Guild, and 'Educational Topics of the Day, or Chips from a Teacher's Workshop,' by L. R. Klemm, Ph. D.

Messrs. Lee and Shepard are about to issue with additions covering his completed career, a new edition of 'Our Standard

Bearer; or the Life of General Ulysses S. Grant; his Youth, his Manhood, his Campaigns, and his Eminent Services in the Reconstruction of the Nation his Sword has redeemed; as seen and related by Captain Bernard Galligasken, Cosmopolitan, and written out by Oliver Optic.' The work is illustrated by the well-known artist, Thomas Nast.

PERSEVERANCE ISLAND.

General Douglas Frazar's 'Perseverance Island,' in new edition by Lee and Shepard, Boston, is a truly wonderful book, on the publication of which all boys and lovers of spirited, adventurous, wholesome reading are to be congratulated in the heartiest manner. For its sub-title the remarkable volume is called the 'Robinson Crusoe of the Nineteenth Century.' It might have been well to have called it the American Robinson Crusoe, as the author describes the achievements of a Vermont Yankee on a lonely island in the Pacific, where he was shipwrecked, and yet attained wealth, comfort, and all that is worth having, save human companionship. The story is told without any attempt at fine writing; but the homely language of the volume will make it all the more welcome with sensible people. The evident purpose of this Yankee Crusoe, is to show how much a man may achieve who knows how to help himself. The hero joins a Pacific island expedition, but is thrown, after some remarkable adventures, on a lonely island, where his first duty consists in building a fire without any modern appliances, and in distilling sea water that he may quench his thirst. Next he makes a hat for himself, then a knife and a lamp. After this he builds a hut; and on an exploring tour he discovers wild goats, the descendants of animals left there a hundred years before by a previous settler; he finds coal, sulphur, and wild grapes. He proceeds to make bricks, to melt iron, to make steel, and to attempt astronomical observations. He constructs a sub-marine boat, manufactures glass, builds a steam-yacht, discovers the remains of a pirate and his millions of treasure, finds gold, and kills a sea-serpent. All this is very wonderful. But the best part of the story, which is told with exquisite simplicity, consists in teaching a boy—and his father—how to overcome obstacles, how to make much of small things, how to use one's head and hands, and how to make nature subservient to human wants and comforts. In an interesting note at the close is a quotation from the *New York Herald*, referring to the arrival of William Anderson, at New York, on the U. S. S. S. Tallapoosa, and giving suggestions as to the future of that remarkable personage. No spirited boy, no sensible person of whatever age, will lay the book aside without having caught a part of the author's courage, manliness and spirit of self-help. It is a treasure for which one ought to bespeak the widest possible attention. No

popular library and no boy's reading is complete without 'Perseverance Island.'

The Youth's Companion will issue 12 pages weekly the coming year, and proposes to improve otherwise—a difficult undertaking.

Prof. S. P. Langley has been elected Secretary of the Smithsonian Institute by the board of regents.

A weekly illustrated journal of horticulture, garden botany, forestry, and kindred subjects will soon begin publication in New York, under the editorial direction of Prof. C. S. Sargent. The principal botanists and horticulturists of the East will support what we hope may prove a successful undertaking.

It is reported that Professor Cashman, who has charge of a Government exploring expedition in Southern Arizona, has unearthed a whole city, and exhumed a large number of skeletons. The location is about 80 miles north-west of Tucson, near the junction of the Salt River with the Gila.

A much needed work, 'A Nomenclature of Colors,' by Prof. Robert Ridgway, has just been issued by Little, Brown & Co., Boston, dedicated to the late Prof. Baird. It is especially intended for smithologists, as it gives a dictionary of technical terms used in describing birds, illustrated with seventeen plates. ten colored, the latter accurately defining different shades and combinations of colors. Either in determination or descriptive zoölogical or botanical work, both the amateur and professional will find this book useful for reference.

Little, Brown & Co., the Boston publishers, will shortly publish a volume of delightful and deliciously humorous stories, entitled 'Five Hundred Dollars, and Other Stories of New England Life,' by C. H. W., a new writer, who has met with considerable favor as a contributor to the 'Century Magazine,' in which several of the stories were originally published. The volume will include 'Five Hundred Dollars,' 'The Village Convict,' 'Saint Patrick,' 'Eli,' 'In Madeira Place,' and 'The New Minister's Great Opportunity.'

NECROLOGY.

Dr. J. C McCormick, of Strawberry Plains, Tenn., was killed October 4, 1887, by the collapse of an Indian mound which he was exploring. Archæology and conchology were his favorite studies.

Prof. Gustav Robert Kirchhoff, died October 17, at Berlin. This eminent physicist was born on March 12, 1824. Chemistry, physics and astronomy, each owes much of its recent development to him.

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The West American Scientist.

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49	Western Gull	15
120c	Farallone Cormorant	50
122	Brandt's "	25
123b	Baird's "	25
*183	Roseate Spoonbill	40
*197	Snowy Heron	08
*199	Louisiana Heron	08
*200	Little Blue "	08
*201	Green "	05
202	Black-crowned Night Heron	08
*203	Yellow " " "	18
*218	Purple Gallinole	15
273	Killdeer	10
*289b	Texan Bob White	05
*294	California Partridge	06
*294a	" Valley Partridge	05
*316	Morning Dove	02
*360	Sparrow Hawk	15
*365	Barn Owl	15
*378	Burrowing Owl	15
*385	Road Runner	15
*387	Yellow-billed Cuckoo	08
*409	Red-bellied Woodpecker	15
413	Red-shaped Flicker	05
*423	Chimney Swift	10
*443	Scissor-tailed Fly-catcher	08
447	Arkansas King-bird	05
*448	Cassin's "	20
458	Black Pewee	10
*474f	Ruddy-horned Lark	18
*488	Common Crow	05
*495	Cow Bird	03
*498	Red-winged Blackbird	02
499	Bi-colored "	04
500	Tri-colored "	10
501	Meadow Lark	08
501b	Western Meadow Lark	05
505a	Arizona Hooded Oriole	25
*506	Orchard Oriole	04
*508	Bullock's "	08
*510	Brewer's Blackbird	04
511	Purple Grackle	04
*511b	Bronzed "	04
*513	Boat-tailed Grackle	04
*519	House Finch	05
*519a	Crimson House Finch	04
*529	American Goldfinch	05
*530	Green-backed Goldfinch	10
531	Lawrence's Goldfinch	13
*540	Vesper Sparrow	03
*552	Lark Sparrow	05
*542a	Western Lark Sparrow	08
*560	Chipping Sparrow	02
574	Bell's "	75
*581	Song "	02
*581c	Heerman's Song Sparrow	08
581d	Samuel's " "	05
591b	California Brown Towhee	05
*593	Cardinal Grosbeak	04
604	Black-throated Banting	14
611	Purple Martin	10
*612	Cliff Swallow	03
*613	Barn "	03
*616	Bank "	04
*620	Phanopepla	35
*622a	White-rumped Shrike	04
*624	Red-eyed Virei	05
*648	Blue Yellow-backed Warbler	13
*652	Yellow Warbler	03
*703	Mocking Bird	04
*704	Cat Bird	02
705	Brown Thrasher	03
710	California "	13
713	Cactus Wren	08
715	Rock "	37
721a	Parkman's Wren	04
722	Winter "	37
725	Long-billed Marsh Wren	04
*731	Tufted Titmouse	37
*733	Plain "	25
*736	Carolina Chickadee	13
*755	Wood Thrush	04
*758	Russet-backed Thrush	06
*761	Robin	03
†766	Blue Bird	03
767	Western Blue Bird	08

Foreign Copper Coins.

Great Britain, ½ penny, Geo. II	$ 10
" " " " Victoria	05
" " 1 farthing, "	05
" " 1 " " laureated	05
Great Britain, ½ penny, Victoria, laureated	05
Great Britain, 1 farthing, Geo. IV	10
" " 1 penny, " III	10
" " ½ " " "	10
" " 1 " Victoria	03
" " 1 farthing, Geo. II	20
Honduras, provisional money, rude, 8 reals	15
Mexico, 1 centavo, nickel	05
" 2 " "	08
" 5 " "	10
Hanover, 1 pfennig	05
" 2 "	10
" 2 " Horse	10
Russia, 2 kopecs, Nicholas II	10

Rome, 4th bronze coins, found in digging Suez canal, 1500 years old.... 12
India, old dumps..... 10
Denmark, Frederick VII, 1 skilling.. 05
Sweden, 2½ skilling, Frederick VI . 10
Japan, old sen, scarce..... 50
Peru, provisional money, scarce, 5 centavos..... 20
Peru, provisional money, scarce, 10 centavos..... 20
Holland, 1 cent..... 10
France, 5 centimes, Nap. III..... 05
" 10 " " " 05
" 1 " laureated head, Nap. III..... 10
Japan, tempo..... 15
Portugal, large coin of..... 20
Egypt, 20 para, (silvered)..... 10
Russia, 1 kopec, (bright)..... 10
Russia, Elizabeth, old..... 15
Germany, 4 varieties..... 20

U. S. Cents.

1803, head to right.....$ 25
1817, head to left, 13 stars..... 10
1818, head to left..... 08
1819, head to left..... 10
1820, uncirculated..... 40
1821, head to left..... 30
1822, " " 30
1825, " " 20
1827, " " 15
1828, " " 20
1831, " " 10
1832, " " 10
1833, " " 10
1834, " " 05
1835, head 1834..... 10
1837, plain, hair-string..... 10
1838..... 08
1840..... 08
1852, head to left..... 05
1868, bronze, Indian head..... 08
1880, " " " 05

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Half-Dollar, round, different dates...$ 55
" " octagonal, " " ... 55
Quarter-Dollar, " " " ... 30
" " round, " " ... 30

Confederate Money.

Interest note, train of cars.....$ 10
$500, Feb. 17, 1864..... 50
100, " " 12
100, " " small note, very rare..... 1 50
50, Feb. 17, 1864..... 08
20, " " 08
10, " " 05
5, " " 05
2, " " 10
1, " " 10
50 cts., " " 10

Curiosities

Agates, (polished).....$ 25
Cal. Sea Urchins.....05 to 10
Liver Beans.....05 to 10
Alligator Teeth..... 05
Sharks Eggs..... 15
Pampas Grass Plumes..... 25
Humming Bird's Nests..... 25
Cactus Wood, (curious).....05 to 25
Earthquake Sand, thrown up by the Charleston Earthquakes, several colors in a vial..... 15
Chinese Nuts.....2 for 05
" Game Stones.....2 for 05
" Slow Matches.....2 for 05
" Game Cards.....2 for 05
" Chopsticks.....per pair 06
" Chinese Coins (very old) each 05
Japanese Paper Napkins..... 05
" Tempo Coin (large oval)... 10
" Cat's Eyes (polished)..... 15

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Acmar Personar..... 02
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THE

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JANUARY, 1888.

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REMINISCENCES OF A NATURALIST, BIOGRAPHICAL, ETC.—II.

DR. WESLEY NEWCOMB.

In the summer of 1864 I met that veteran conchologist, Dr. Wesley Newcomb, for the first time, having called upon him in response to an invitation sent to me through the late Dr. William M. Gobb, the latter at that time holding the position of Paleontologist in the staff of the Geological Survey of California, of which Prof. J. D. Whitney was the director. I remember very clearly the afternoon when I first met the worthy doctor, and the acquaintanceship then commenced developed into a friendship that still continues undiminished, though I have not seen him for many years.

At the time referred to he lived in Oakland, California, where he pursued his profession and had an extensive practice. Dr. Newcomb is at the present writing probably the oldest American conchologist. He has outlived his earlier scientific or rather conchological friends; Gould, the elder Binney, Anthony, Bland, and, last but not least, Dr. Isaac Lea, all Americans, as well as Reeve, Cuming and others of England who were also his friends and correspondents. Dr. Newcomb lived for many years in the Sandwich Islands, and there had excellent opportunities for collecting not only the beautiful land shells of that remarkable insular group, Achatinellæ, the geographical distribution of which is nearly if not wholly confined to said islands, but also many interesting and attractive marine and fresh-water species. Dr. Newcomb improved the opportunity to make not only an exhaustive collection of the Achatinellæ, but also to make a thorough study of these somewhat variable and therefore difficult shells. By careful comparison he reached conclusions which are probably more correct than the greater portion of the work of others in the shells of this group.

At the time Dr. Newcomb resided in the islands, the Achatinellæ were abundant, and therefore he had no lack of material. Since and of late years, with the clearing of the lands and the

development of agriculture, these shells have been gradually, even rapidly decreasing, and now have, it is said, ceased to be numerous. Dr. Newcomb described many new species, and probably has the finest collection in the world of these forms. His residence in the islands also gave him unusual advantages in the way of obtaining shells from the whaling vessels which at that time made Honolulu a base for supplies, etc.; and, again, from his missionary friends who were established in other islands near or remote, who occasionally visited Honolulu, he received many additions to his collection of much value. As Dr. Newcomb has always been liberal in explaining and giving outright his sample specimens, he naturally received from many grateful recipients of his favors whatever they could furnish that might be desiderata to him. He also, as before stated, reckoned many well-known and leading conchologists among his correspondents and friends, and Cuming especially contributed many rare and desirable species to the Newcomb museum in return for what the Doctor had sent to enrich the Cumingian cabinet. After Dr. Newcomb came to California and made Oakland his home, he continued as before with unremitting effort to add to his already large and valuable collection by collecting himself the shells of the Pacific coast, and by encouraging and assisting others to do the same. He has described several species of West American land and marine shells, and his conchological papers have been published in the proceedings of the *California Academy of Sciences* and elsewhere.

The good Doctor has also collected in the field at all the principal points on the coast of California, on both sides of the Isthmus of Darien, viz., Panama and Aspinwall; in the San Domingo and on both coasts of Florida, and quite likely elsewhere.

I shall never forget a little trip to the coast made by Doctor Newcomb and myself about 1867. We were led to investigate the neighborhood of Bodega, and had a tiresome ride one day by stage to the 'Corners' (Bodega Corners) where we had to stop over night before we could go on. We had an uncomfortable room together on the ground floor of the only public house there, so near the bar-room that we were kept awake long after we had gone to bed by the loud talk, wrangling, and profanity which surpassed in volume and unceasing flow anything I had ever before experienced. The next morning we were both glad to get away from such a 'hell-hole,' and after paying our bill the Doctor remarked to the landlord that he had never been in a place where such gross profanity prevailed, and he hoped never to have such an experience again.

The landlord was so abashed by my friend's comments and rebuke, that not only he, but some of the rough looking loafers sitting near, really appeared to exhibit some shame. After leaving we proceeded by stage to the Head, as the bold granite bluff is called, that makes out into the ocean in this neighborhood, and

soon reached the house which was to be our base. Our stay in this region was not very satisfactory. All the time we were there the wind and sea were rough, and it was dreary and chilling in the extreme, and the collecting ground we found to be quite limited. At low tide we obtained specimens of Macana nasuta and M. Secta var edulis, also Tapes Pettitti from the same hole and at the same time by digging in the mud, Lasea rubra was also abundant; an occasional red abalone (H.rufescens) was met with, and I had the pleasure of finding a few specimens of Trivia Californica (which I had previously detected alive at Monterey) among the smaller drift of the beach. Near the Trivia, as I had anticipated, I got a few specimens of the stumpy corals that I discovered the Trivia to be parasitic upon at the more southerly point. But it is not so much for the rehearsing of the "finds," as for another matter, that has led me to mention the Bodega trip.

While climbing over the bald and rocky Head, which has been roughened all over like a coarse rasp or file, by the weathering out of the softer components, leaving the harder quartz portion sticking out all over the surface in jagged tooth-like projections, hunting for anything in our line and getting nothing but some peculiarly rough specimens of Littorina planaxis; I heard a cry or call from the Doctor, and on looking up was unable to see him. He was not in sight; but a minute or two before he had been nearly at my side. For a moment my heart stopped beating; I thought he had fallen, or been washed or swept into the ocean. On scrambling over the rocks, I saw him just "picking himself up," a wave of unusual height and volume had struck him behind as he stood with his back to the sea, and had thrown him forward and down with great force, his hands, which he had extended to save himself as he fell, were badly cut by the sharp points of the quartz, and were bleeding considerably. It was bad enough as it was, but the shock I received at his momentary disappearance on that occasion, has remained as the chief souvenir of our Bodega expedition, which altogether was an unprofitable affair. Though the northerly distribution of Trivia Californica was by this visit shown to be a hundred miles further north than before credited.

I am happy to know that my esteemed friend, though carrying the burden of many years, is still in rugged health, and continues to find the same pleasure in nature and the particular growth of natural form that he is so familiar with, that he did in the beginning, in the years before we met. As is generally known, many years ago the Newcombian Collection was purchased by Ezra S. Cornell, for the Cornell University, at Ithaca, N.Y., and Dr. Newcomb has been retained as custodian ever since its purchase. He is constantly active and adding to it every day. Long may he continue in life and health, is the wish of all who know him.

R. E. C. Stearns

THE AMERICAN CROSSBILL.

The American Crossbill, Loxia Curvirostra, known also by the name of Red Crossbill, is one of the handsomest of our birds, as well as one of the most peculiar. These birds have long been celebrated on account of the singular form of their beak, from which they derive their name.

In these birds the two mandibles—which are rather long, thick at the base, and much curved, crossing each other at the points, when the bill is closed. In different individuals, even of the same species, the upper and lower mandibles are found variously directed to the right and left. The structure, when first seen looks not unlike a malformation, and to prohibit the bird from picking up seeds or feeding itself in any way. But when seen feeding, it speedily proves itself to be favored with all the ordinary faculties of birds, and to be as capable of obtaining its food as any of the straight-beaked birds.

The Crossbills obtain their principle food, the seeds of firs and pines, by tearing up the cones. They bring the points of the mandibles together—which they can do so as to pick up a very small seed—and insert them into the cone, when a powerful lateral movement widens the opening quite sufficiently, and the tongue, which terminates in a singular movable scoop, is inserted to detach the seed. It is also very fond of apple-pips, and, settling on a tree where ripe apples are to be found, attacks the fruit with its beak, and in a very few moments cuts a hole fairly into the core, from

which it daintily picks out the seeds and eats them, rejecting the ripe pulpy fruit in which they have been enveloped. As the Crossbill is rather a voracious bird, the havoc which it will make in an orchard may be imagined.

The male, as is the case with all birds, has the most beautiful plumage. The throat and breast are red, with here and there a few feathers of drab and yellowish-green; while the head and back are prettily colored with a variegated mixture of green, brown and red, all of which have a peculiar metallic lustre; wings black, turning to a brownish hue at the shoulders; abdomen, drab; tail, black; tail coverts, bright red; bill, black, and three-fourths of an inch in length.

Although Dame Nature has not decked the female with quite so lavish a hand, she is, nevertheless, very prettily arrayed. The throat, head and breast are clothed in a mixture of yellow, green, red and drab; back, red, green and black; tail feathers, black with white margin; tail coverts, bright yellow; abdomen, drab; wings, black and white. The total length of the Crossbill, from tip of beak to extremity of tail, is six inches. The tail has a very deep nitch in the end, which is very conspicuous when flying.

The nest is generally built in fir trees in a somewhat secluded spot, and contains generally four greenish-white eggs, spotted and dotted with varying shades of lavender-brown, with a few heavy surface spots of dark purple-brown. The eggs average in size .75 by .56.—*Naturalist's Companion.*

A RABBIT HUNT.

One Monday morning I set out with my dog on a mile and a half walk, to meet a friend with whom I had engaged to go on a rabbit hunt. I had the good luck to get a ride part of the way, and soon arrived at my friend's house. After a little delay, we started with guns over our shoulders, and on our feet rubber boots suitable for wading in deep snow. We had not gone far when we heard near us the baying of hounds, and soon came upon two other hunters. One was an old dog-trainer who lived in the same town that I lived in, and with whom I had been hunting many times. He had with him a ferret, which we valued as highly as a boy values a gun. We told him that if he would come with us we would show him some rabbit holes, where he might use his ferret. He readily complied with our request, and we were soon walking briskly on.

When we reached the hole he got down on his knees, cleared out the snow and leaves, took out his ferret very carefully, and let it go hesitatingly in. Meanwhile one of us stood at the other end of the hole, and placed his hands so that if the rabbit tried to run out, he must run between his fingers. After waiting a minute, the man suddenly exclaimed, 'I've got him,' and lifted up a fine

large rabbit. As I looked down on it, I saw its large expressive eyes look pleadingly up to me, but I had not long to look, for the man gave a quick jerk with the hand around its neck, and it was dead. 'What did I kill him for?' exclaimed the man, 'we might have had some fine sport. We could have thrown him into yonder field and seen him run; he would not have stood any chance among so many dogs.' And I find that this cruel sport is practiced a good deal among sportsmen. They claim that it is to train the dog to chase rabbits, but I have come to the conclusion that it is done for sport as well, and have learned to pity the poor rabbit who is chased first by foxes and then by hounds, and at last flees to its hole in hope of refuge, where it is frightened out by the cruel ferret and killed. *L. A. Welles.*

NATURAL HISTORY JOTTINGS.

Loco Weeds. The disease called 'loco' is by no means unfrequent in Custer county, and, as elsewhere, is attributed to the eating of certain Leguminose plants. In this district, at any rate, I think there can be no doubt that Oxytropis lamberti Pursh is the culprit; although it would appear that in California a species of Astragalus is held responsible, and another species, A. mollissimus is stated (Rept. Comm. Agric. 1886, p. 75 and 1884 p. 124) to cause loco-poisoning in Colorado. So far as I know, O. lamberti is found only on the Eastern slope in Colorado, but is generally abundant when it occurs.

Aphodius Vittatus Say, forms Niger and Nigromarginatus. At Haydens, Lake county, Col., on August 17th, I found specimens of this beetle, representing two varieties; the first entirely black, except for the merest trace of red on the elytra, and the other with the head and thorax black, but the elytra reddish bordered with blackish. Until further and numerous specimens have been procured, it cannot be ascertained which is the prevalent form in Colorado, but it is noteworthy that in Europe, where similar variation obtains in A. plagiatus L., the dark variety is normal in England, while that with red dashes on the elytra is the common form on the continent. (See Wollaston, 'The Variation of Species,' 1856, p. 61.) I have elsewhere ('Entomologist,' 1887, p. 58) attempted to show that a damp climate favors melanism, and the case of A. plagiatus supports this view; so we may expect that in Colorado the Nigromarginatus form of A. vittatus will prove commonest, owing to the dryness of the atmosphere, although in Europe mountain forms are mostly dark.

Geranium Richardsoni form Albiflorum. I found this variety on September 15th in the Buzzard Creek Valley, Mesa Co., Col., together with the typical form. The variety had white flowers, and though agreeing in every other respect with G.

Richardsoni F. and M., the cauline leaves were only 3-cleft, the radical ones being 6 to 7-cleft.

Succinea. Although they have been described under different names by American authors, there can be no doubt that species of this Molluscan genus are common both to Europe and America. From a careful comparison of American specimens of Succinea ovalis Gould with European examples of S. pfeifferi Rossm. I united these two so-called species, and more recently I obtained a Succinea at Niagara Falls, which I find it impossible to distinguish from the European S. putris Linn. S. pfeifferi has been recorded from Grand Co., Col., as S. ovalis by Ingersoll.

Limnæa Palustris form Decollata. I found this variety, together with the type and a species of Sphoerium in a pond near Black Lake, Summit Co., Col., on August 29th. I originally described it from specimens obtained on Barnes Common, England, in 1885.

Colaptes Mexicanus. This interesting woodpecker is very frequent in Colorado, on both slopes of the mountains. During the summer they used to come in the early morning and peck at the wooden tiles of our house (Swift Creek, near West Cliff), just in the manner related in Baird, Brewer and Ridgway's 'History of North American Birds' Mr. Ridgway now considers C. Mexicanus merely a geographical race of the Eastern C. Auratus Linn.

Camnula atrox. On entering Leadville on August 18th, I found this locust very abundant in the streets, and the next day observed it in great profusion while crossing Fremont Pass. I also took it on August 29th on Black Lake Creek, Summit Co., in company with Arphia teporata Scudd., and an unidentified species (Hippiocus?) with orange underwings. C. Atrox appears therefore to be multiplying and extending its range eastward, as predicted in the Rept. Comm. Agric. 1885. I am told that extensive damage has been done by locusts this year about the Greenhorn Range, Col., but I have not been able to find out whether this species was responsible, or some other.

Colorado Fauna and Flora. I am doing what I can towards working out the fauna and floral of this State, and shall be very grateful to any of your readers for any help they may be willing to give, either by informing me concerning specimens they have collected here, or referring me to published records relating to Colorado. Distance from libraries and centres of information places obstacles in the way of ascertaining the recorded fauna of the State, which I would fain ask for help in removing.

West Cliff, Custer Co., Col., Dec. 1887. *T. D. A. Cockerell.*

J. G. Lemmon and wife, of Oakland, recently paid a long-deferred visit to San Diego, and propose to return again.

TURTLES AS PETS.

Among other queer pets, I at one time was the possessor of two specimens of the snapping-turtle. (Chelydra Serpentina).

One day while fishing I hooked the largest of these turtles, which measured about eighteen inches in length, and drew him, struggling, from the slimy depths of his native pond. The other turtle was captured by my brother in the following manner: While walking along the bank of a stream, he saw a small bird wildly fluttering to release itself from some invisible power which held it a prisoner. Approaching the bird, which proved to be a species of snipe, he discovered that its foot was firmly held in the strong jaws of a snapping-turtle, which had cunningly buried itself from sight in the mud, to wait for its prey. Releasing the bird, he made the turtle in turn, a prisoner, and carried it home, where it soon became a fellow prisoner with his larger brother. I used frequently to hitch these turtles before a small cart, and then, placing half a dozen or more of the little mud turtles in the cart, would give them a ride 'for their health.' When hitched single, they would go very well, but sometimes I tried to drive them 'tandem,' and as they generally wished to go in opposite directions, they were somewhat hard to manage. I kept my turtles for two or three months, when they climbed over a fence about two feet high, and escaped.

Although I found these very interesting as pets, my favorites were the little turtles which are known as 'tortoises' or 'mud-turtles.' They make fine pets as they are easily captured, easily kept, and rarely offer to bite. A small pond near my home contained great numbers of these turtles. They were easily caught by surprising them while sunning themselves in the shallow water of the pond, and then following their muddy tracks to the end, where a turtle was almost invariably to be found. My aquarium consisted of a common wash-tub, partially filled with water, with a goodly allowance of mud in the bottom; to prevent their climbing out I nailed slats around the edge of the tub, and a slanting board for the turtles to sun themselves upon, completed the arrangement of my miniature pond, the occupants of which at one time numbered seventeen; some of them were scarcely as large as a silver dollar. I gave them every morning a meal of earth-worms, and they learned to look for my coming, and would eat from my hands. Sometimes they would have trouble among themselves over the possession of a worm, and then they would fight long and stubbornly, the battle rarely ending until the worm in question parted in the middle. At one time one of the turtles, made angry by teasing, suddenly closed his jaws upon the tail of a sleepy cat, which immediately showed such life as would have astonished her at any other time.

A Boy Naturalist.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

DECEMBER 15, 1887.

A letter was received from Arthur J. Doherty of Manchester, England, relating to the demonstrations of preparing and mounting of microscopic objects which the society has engaged him to give in this city. Mr. Doherty is an excellent preparer of microscopic material, and the members intend, on his arrival, to hold meetings every other evening for two weeks, each evening to be devoted to practical mounting of a certain class of objects.

A letter was read from J. C. Rumbock of Vienna, transmitting specimens of diatomaceous earths from Oomaru, New Zealand, and from Szent Peter and Szakel, in Hungary. There were also donations of the same kind from William Irelan, State Mineralogist, one being diatomaceous earth from near Pioche, Nev., and the other from a deposit near the Edge Hill Vineyard, in Napa county.

Mr. Riedy and Dr. Riehl reported upon a previous donation from Mr. Irelan from Shasta county, that the earth was rich in diatoms, but only a few forms were observable, and they of the commoner kinds.

The announcement that a piece of the society's apparatus was held in the New York Custom House for payment of duty when the society is, by law, entitled to the admission of its property duty free, induced a discussion on the subject of the admission of all microscopical instruments, whether for the society or for individual investigators. Dr. Mouser thought a memorial ought to be prepared and transmitted to Congress, and believed it would secure the support of the Congressman from this district. The wisdom of such a policy on the part of the Government was urged, because it would really aid the scientific investigator, while the present tariff continually oppresses and hampers him. After a general discussion of the subject a committee to prepare a memorial to Congress was appointed as follows: Henry C. Hyde, Dr. S. M. Mouser, Dr. J. M. Selfridge.

Dr. H. W. Harkness called the attention of the society to the statement of F. Lamson Scribner, United States Mycologist, that the *Peronospora viticola* was not found in this State. Dr. Harkness stated that he had found it as early as 1872, and an account of its occurrence was published in the bulletin of the California Academy of Sciences for June, 1887.

Edward J. Wickson, Rec. Sec.

The 'Santa Clara Valley' Agassiz Association chapter has recently been organized at the office of that journal. Louise E. Francis, assistant editor *Santa Clara Valley*, San Jose, Cal., is the chapter's address.

THE MISSOURI RIVER BLUFF DEPOSIT.

I have been asked to speak to you of some of the more distinctive features of Western Geology, and have decided to talk to-day of what is known as the 'Bluff Deposit' of the Missouri River valley. This deposit is to be observed, and has been studied along some other rivers of our central system, and yet it reaches its greatest development and possesses the greatest interest along this valley, so we will confine ourselves to the 'Big Muddy,' if you please.

It has been my privilege to make a rather thorough study of the formation as it is exhibited at Council Bluffs, Iowa, and on down the river to Kansas City, and this article will be written partly from my own observations and partly from the work of our various geological surveys.

This bluff system differs radically from what is usually known by that name along the valleys of rivers in other parts of the country, both as regards its origin, its chemical composition and physical character.

Whenever a stream of water, free from too great an admixture of sedimentary material, begins to flow over the surface of the earth, the natural tendency is to form a bed by cutting down into the earth, to deepen and at the same time narrow the channel This is due to what is called the erosive power of the water, and the rapidity of its action depends upon the velocity of the current and the character of the material through which the bed is cut.

Start at the bed of any well marked stream and as you go back from the stream you will find the banks of the valley rising as they recede, and in very many cases you will be able to mark the higher levels that have constituted the river bed at successive stages of its growth. These modelings of the surface and rocky bluffs, due to the erosive power mentioned above, constitute what is generally known as the bluffs of our river systems.

The Missouri river steps in here and asserts its independence of all established custom, renounces its adherence to fashion, and founds a system of bluffs upon a new plan. Instead of being the result of erosion, these bluffs have been produced by a process of accretion and deposition of sediment.

The exact origin of this sediment has been disputed by the many geological authorities who have studied and published it, but it is recognized as a formation equivalent to the Loess of the Rhine and other European rivers. Dr. Owen called the material a 'siliceous marl.' and others 'siliceous loam.' Prof. Swallow, of Missouri, applied the name "bluff," which is accepted in lieu of something more satisfactory from a strictly scientific point of view.

The composition of several specimens of the material taken in Iowa, according to Prof. Emery's report (Geology of Iowa, 1870) is about 82% of silica, 9% of carbonate of lime, 3% of iron and less

than one per cent. of alumina, or clay, which latter feature please bear in mind.

As to its origin—that is the agency through which it was deposited—it has been agreed that it is of what is called lacustrian, or lake origin, or in other words it is a sedimentary deposit from suspension in the quiet waters of a lake. Some formerly urged that this material is co-original with that which is recognized as glacial drift; but there are two objections to that theory, namely, the absence of alumina, or clay, which always characterizes the glacial drift; and, secondly, there is found underlying the bluff deposit the bed of true boulder clay. That it is not, on the other hand, of very recent origin is proven by the fact that in some localities the formations known as terraces, belonging to the Tertiary Epoch are observed upon its surface, or moulded from it Fossils of the Post Tertiary Period are found in it, comprising almost entirely mollusks, which are closely allied or identical with existing species of fresh water mollusks.

When these things are all considered, geologists feel safe in concluding that immediately upon the recovery of the country from the allopathic dose of ice which had been administered by the Gods of the North, and while our friend, the Big Muddy, was fed by such an extreme amount of water from the melting ice-sheet as it receded, that it filled a channel so very wide and lake-like as to be scarcely defined as a channel at all, the bluff material was deposited. That the beds were deposited evenly and without a change of level of the country, as some have argued, is proven by the evenness of texture of the material, for you are doubtless all aware that any fluctuation in the velocity of a stream, as affected by a change of the level of its bed, can be certainly detected by a corresponding variation in its sedimentary deposits. The bed of this lake stream, then, it may be decided, was at a constant level.

These bluffs now constitute long chains, or ridges, parallel to the stream, and observable for many miles along it in continuous chains. This feature becomes less and less prominent as we go back from the river, and is soon lost in the rolling surface of the prairie. This prominent bluff character along the river is due to a secondary action of the water in eroding, or cutting down through the material after its deposition as the stream shrank and was relieved of some of its detritus.

Starting from Creston, Iowa, on the line of the C., B. & Q. R. R. we go directly west through this same tier of counties to the river, a distance of about ninety miles, without seeing anything to excite remark or to arouse any suspicion of the existence of the bluff material until we reach the town of Glenwood.

Here it is that the railroad cuts through the line of the bluffs, and it then runs almost due north between the river and the line to Council Bluffs, a distance of about ten miles, giving one an

excellent opportunity to study the physical character of the formation.

The first thing, in all probability, that will attract the attention of the unaccustomed observer will be the abrupt manner in which the bluffs from the flood-plain of the river, which stretches without undulation sometimes for four or five miles, I should judge, to the westward from the foot of the bluff-chain. This feature is indeed remarkable when we take into consideration that they contain 82% of silica, or sand. The angle at which dry sand finds its repose is less than 35 degrees, but here we can see walls composed almost wholly of quartz sand rising to a great height and maintaining an angle, which I measured at various places, at 65 degrees—so steep indeed that it is impossible for a human being only ordinarily gifted to scale the slope. This high angle maintained is due to the presence of lime and iron which have, in the course of time, partially cemented the sand grains together. This angle of 65 degrees of which I have spoken is not universal, but is quite frequently observed, more particularly near the summits of the bluffs.

This process of cementation has gone so far that the great angle of inclination is not affected, or is affected but very slightly, by the action of rains or other similar agencies. In many places railroad cuts have been made through the bluff material, and a perpendicular wall will be left which will remain standing unaltered for years. This feaiure is beautifully presented in the neighborhood of St. Joseph, Mo., and to the southward. Wagon roads have been cut through the material near Leavenworth and in Missouri, just across the river, which have left perpendicular walls many feet in height, and these have remained standing without a particle of change that can be observed for many years, although the material is light in character, and can be easily crumbled in the hand.

Another feature of the bluffs at Council Bluffs, and at other places, more particularly in the northern part of the bluff-covered area, is the absence of the luxurious timber growth which almost invariably characterizes our river valleys. In many places there is a plentiful growth of scrub elm and oak a round the bases of the bluffs, and here and there thick growths of this dwarfed timber will be seen making a rush up the precipitous slopes, in a manner suggestive of the attempts of a body of soldiery to scale some disputed and coveted point, but only in rare instances has the body succeeded in placing its banner on the top. As we go inland, or back from the river, and the prominent bluff character is lost; we frequently find the entire face of the formation thickly wooded; but where the bluff formation is most pronounced the tops are always bare in the northerly regions — even the grasses do not attain to the usual luxuriance, but everywhere the pale buff colored bluff earth is visible, while just at the foot of the hills

is the rich alluvial soil of the river bed, wonderfully prolific of the vegetation belonging to this locality. As we go southward along the valley this treelessness is not so marked, but the entire river bluff is frequently heavily wooded, and it is predicted that the same thing will soon be the case in Iowa. Analyses show that the soil is most admirably adapted to sustain vegetation, only requiring the agency of organic matter to perfect its usefulness in this direction.

One other thing which has been hinted at above, and which is worthy of note, is the general fineness of the material, although the boulder clay is immediately beneath it; and in many places along the valley I have seen it resting upon sandstone and limestane outcropping here and there.

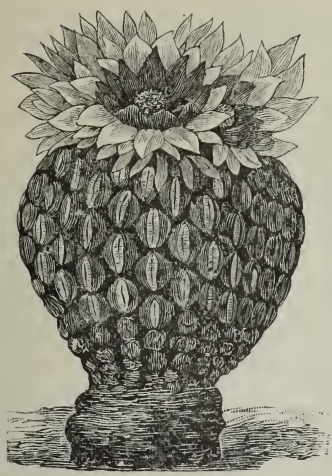
The material of which the bluffs are composed in Iowa and Missouri and Nebraska is supposed to have been derived from the sandy and chalky beds of the Tertiary and Cretaceous ages of the upper Missouri valley. There are no palæontological evidences of such derivation, but it is inferred from the similarity of the chemical composition of the bluff soil to that of the beds named.

If I were to continue this article until I had described everything connected with the deposit which possesses any interest to the geologist, the limits assigned to me would have to be indefinitely extended, and so, observant of the abrupt character of the bluffs themselves, I will bring this paper to an abrupt close.

W. R. Lighton.

A SHARP FAMILY—THE CACTUSES.

THE HATCHET CACTUS.



Pelecyphora Aselliformis.

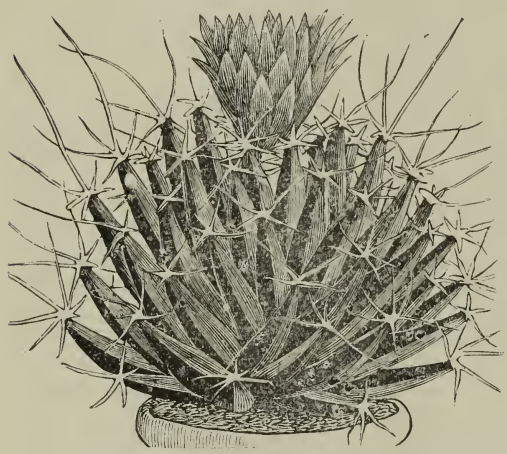
One of the most interesting of cactuses is the Pelecyphora, remarkable for its peculiar structure. It is closely related to the mamillarias, of which we shall speak later, having a short cylindrical stem covered with mamillæ or tubercles of a flattened form, which has been supposed to bear some resemblance to a hatchet, as the generic name implies. In the place of spines are two rows of flat horny scales, which overlap like the tiles of a roof. The flowers are one to one and a half inches in diameter, and borne near the summit of the plant. There are several series of sepals and petals, and numerous stamens and stigmas to the flower.

Pelecyphora aselliformis, figured

above, is the principle species. It requires a sandy soil, good drainage, and very careful supplies of water. It is usually grown from seeds, which germinate freely in moderate heat. It is very rare, and found in few collections.

P. pectinata, also quite rare, differs slightly in structure. A monstrosity of this is given in the horticultural name of P. pectinata var. cristata, and as usual with malformations of any plant, are exceedingly rare.

LEUCHTENBERGIA.



Leuchtenbergia Principis.

Another very interesting genus, in a botanical point of view, is Leuchtenbergia, of which the principal characters known to me are shown in the accompanying figure of, I believe, the only species. The flowers are of a rich, clear yellow tint.

PFEIFFERA.

This Mexican genus, named in honor of the noted naturalist, Pfeiffer, contains but a single species, with triangular or quadrangular stems and white rose-tinted flowers. It is named P. cereiformis, from its somewhat resembling a cereus.

C. R. ORCUTT.

Attention is called to the great variety in the table of contents of *The Century* for January. Its subjects embrace an authoritative account of the formation of Lincoln's Cabinet in the history by the President's private secretaries, with many unpublished letters; Mr. Kennan's startling record of personal investigations of 'Russian Provincial Prisons;' Professor Atwater's valuable and practical paper on the 'Pecuniary Economy of Food;' an illustrated article on 'The Catacombs of Rome,' by the Rev. Dr. Philip Schaff; in art and literature a critique and personal sketch of John Ruskin by Mr. Stillman, with an excellent portrait for the frontispiece of the number; in sport 'An Elk-Hunt on the Plains,' by Schwatka, with drawings by the younger Inness; in travel 'The Upper Missouri and the Great Falls' by E. V. Smalley, (illustrated); and many other interesting articles.

ORIGINAL BIRD NOTES.

March 26, 1887, I found a nest of the Shore Lark containing four eggs. Incubation was far advanced, showing that the nest must have been commenced early in the month. I think this is the earliest nesting on record.—*S. H. Henry, Bonaparte, Iowa.*

On the 17th of January, 1887, I saw a chimney swallow here. It remained about fifteen minutes.

Henry R. Sharples, West Chester, Pa.

On Chestnut Ridge, Mount Pleasanton, Pa., a pheasant was shot, whose feathers were of the purest white, excepting a few brown feathers on the wings and tail. *G. D. Story.*

Here is a list of the arrival of some of our birds at Leavenworth, Kansas: January 13th, robin and blue bird; February 20th, the blue jay; February 22nd, black bird, meadow lark and barn swallow. *Louis R. Lighton.*

The Purple Linnet. This beautiful and cheerful little songster arrives from the south about the beginning of April. Its head, breast and rump are of a deep lake color, approaching to crimson, and fading into rose color underneath. The feathers on the back are brownish lake, fringed with ash, producing a spotted appearance; wings and tail dusky, edged with reddish-white, tail forked, length six inches. Their nests are usually built on cedars, firs, or other evergreen trees. The eggs are a bright emerald green. These birds are often tamed and kept in cages where they sing very sweetly. *W. A. A.*

EDITORIAL.

Owing to an oversight, several articles in the December issue of this magazine, taken from the *Collectors' Illustrated Magazine*, then in press, were not properly credited, but appeared as original. We refer to the articles by Rev. Stephen Bowers and H. R. Taylor especially in this connection. *The Collectors' Illustrated Magazine* is a new monthly, edited and published by E.M. Haight, our agent at Riverside, Cal., and we would not do him injustice in this manner. 'How the Platypus breeds,' from the *Australian Exchange*, together with the editor's note, we are indebted to the same source for also.

Vol. IV should have commenced with our last issue, but as the paging was continued for Vol. III, we are compelled to begin the fourth volume with the new year.

The Old Curiosity Shop, formerly published at Jamestown, N. Y., will hereafter be issued from San Diego by the editor of this magazine. Will M. Clemens, the former editor, will continue in that position.

The example set by the organizing of a chapter of the Agassiz Association at the office of our contemporary, the *Santa Clara*

Valley, San Jose, Cal., is a good one to follow. Those who wish to form a chapter in this city are invited to co-operate with the editor of this magazine.

Dr. R. E. C. Stearns gives his pleasant recollections of the venerable conchologist, Dr. Simon Newcomb, the second sketch in the series of 'Reminiscences.'

Another new year is at hand. What will it yield us? A happy new year.

'Yea, hope and despondency, pleasure and pain,
The sunshine and rain.'

NECROLOGY.

Dr. Ferdinand Van Vere Hayden died at his residence in Philadelphia, Dec. 22, 1887, after a protracted illness. He was of Puritan descent, born in Westfield, Mass., September 7, 1829. He was a distinguished scientist and widely known as a geologist. He entered Oberlin College when 16 years old and graduated. He was a member of the National Academy of Science, and honorary and corresponding member of a large number of scientific bodies in foreign countries. He occupied more than twenty years in expeditions to the great West, and has extended his investigations over a great portion of Kansas, Nebraska, Colorado, New Mexico, Dakota, Montana, Idaho and Utah. Among his publications were 'The Great West: its Attractions and Resources,' in 1880, and 'North America,' in 1883.

AMONG THE MAGAZINES.

The Budget is profusely illustrated.

The Swiss Cross deserves a wide circulation. With The West American Scientist, $2.00 a year.

The Cottage Hearth, one of the best home magazines, $1.50 a year, will be sent with this magazine one year for only $1.50. Sample free by addressing the publisher at Boston.

Whittier's beautiful poem, telling the legend of 'The Brown Dwarf of Rugen,' will delight all the readers of this number. It is illustrated by the frontispiece and other drawings by E. H. Blashfield.

Mrs. Burnett continues her fascinating story, 'Sara Crewe; or, What Happened at Miss Minchin's,' with the excellent illustrations by R. B. Birch; and Mr. Stockton concludes 'The Clocks of Rodaine,' which began in the December number.

The Century, as usual, is loaded with good reading. Buy it and read the table of contents, and you will read the rest.

The American Geologist comes to our table, containing 68 pages of reading, with illustrations. Six of our leading American geologists, have combined to publish this much needed magazine for one year. It should receive sufficient support to ensure its continued publication. It will be issued monthly at Minneapolis, Minn., at $3.00 a year.

OUR NEWSPAPER FILE.

The Youth's Companion will give in the current volume, among other articles upon science and travel, a series of sketches of actual experiences at sea, by Clark Russell; 'Tricks in mind-reading,' by Dr. Chas. S. Minot, who has often exposed these impostures; 'Animals with more than two eyes,' by Henry Walker; 'Harvard Students on Cape Cod,' a description of a natural history expedition and of the discoveries, by W. W. Nolan, and 'Among the Blue-Nose Fisher-Folk,' by J. M. Oxley. J. G. Wood, C. F. Holder, John Burroughs and Arabella B. Buckley are among others who will contribute facts and incidents in natural history to this excellent family paper.

A GLANCE AT BOOKS.

ANALYTICAL MECHANICS', an elementary treatise by William G. Peck, Ph. D., LL. D., of Columbia College; comes to us from the press of A. S. Barnes & Co., New York. The book was designed as a text book for the School of Mines, and other colleges and schools of science, but is adapted to the needs of the practical mechanic, treating as it does of the application of principles of mathematics and physics to mechanical engineering. It embraces the result of much practical experience.

THE JOURNAL OF THE ELISHA MITCHELL SCIENTIFIC SOCIETY, January to June, 1887, contains some interesting contributions on trap-door spiders by G. F. Atkinson, and a sketch and bibliography of N. M. Hentz.

Frank Cushing, of Washington, well-known for his archæological investigations among the Zuni Indians, is now in San Francisco, devoting himself to Chinese subjects. He has been contending that the Chinese mythic language is the same as the Zuni, and further says that he will agree to translate any Chinese myth represented on the Chinese stage by means of his knowledge of the Zuni myths.

Abundant rains give promise of an excellent season for the farmer and botanist.

WONDERFUL MICA.

Mica, although one of the most common of minerals, is also one of the most interesting. Some of its varieties are the first specimens collected by the beginner, while others are often the last to find their way into the cabinet of the mineralogist. Take from the cabinet the mica group and the collection is robbed of some of its choicest minerals. What other mineral has the perfect cleavage, and the brilliant polish of mica; and what other mineral will separate into those delicate flexible plates? Mica has truly wonderful qualities. What collection would be complete without the beautiful rose and lilac lepidolites, a mineral found in so few localities, principally Maine, Connecticut and Massachusetts. Lepidolite contains from two to five per cent. of the rare earth lithia, that imparts to the blow-pipe flame a deep crimson color. Specimens from Rumford, Maine, are often penetrated with slender crystals of pink tourmaline, while from other localities in the State plates of muscovite surrounded by lepidolite are often completely changed to the latter mineral. Associated with lepidolite (in all three states) are those wonderful colored tourmalines that have made the Mt. Mica locality at Paris, Me., so famous. Clevelandite is also found in connection with both, generally the gangue. From Branchville, Conn., comes another curious curved mica, and some of the specimens would resemble a mass of silvery soap bubbles, while in others may be seen the gradual change from the foliated through the curved to the semi-globular. The gangue is often pure while albite, which gives the mica a pleasing background. Spherical mica from Bennington, Vt., is another old form, brilliant balls from one-fourth to one and one-fourth inches in diameter protrude from the granite matrix. The plumosed variety with the scales arranged in plume-like form is a very desirable specimen. At Mineral Hill, Delaware Co., Pa., has been found the interesting mineral vermiclite, a mineral belonging to the chlorite group but related to the micas. When heated this mineral will expand forty times its original size. Its color is green, but after heating becomes white. Perhaps the most useful and the only mica that has an economical value is the variety 'muscovite,' from mines in Alstead, N. H., have been taken sheets four feet across. In 1883 a single mass weighing 512 lbs. was also discovered. The best quality is used principally in stove manufactories, while the poor quality, clippings, etc, are ground up to be used as a lubricant for machinery and for fire proof packing. There are numerous mineral substances that owe many of their interesting qualities to some form of mica. Take for instance the gem stone aventurine quartz, which is simply transparent quartz spangled with scales of mica. That interesting flexible sandstone (itacolumite), the very gangue of the diamond itself owes much of its flexibility to hydrous mica.—*J. J. Alton in the Collectors' Ills. Magazine.*

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"	5 " "	10
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India, old dumps		10
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Sweden,	2½ skilling, Frederick VI	10
Japan, old sen, scarce		50
Peru, provisional money, scarce, 5 centavos		20
Peru, provisional money, scarce, 10 centavos		20
Holland,	1 cent	10
France,	5 centimes, Nap. III	05
"	10 " " "	05
"	1 " laureated head, Nap. III	10
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VOLUME IV. WHOLE No. 33

THE West American Scientist.

FEBRUARY, 1888.

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THE WEST AMERICAN SCIENTIST.

VOL. 4. FEBRUARY, 1888. No. 34

ANDREW GARRETT.

[The following sketch of this celebrated American conchologist was contributed to the San Francisco *Bulletin*, by Ebenezer V. Cooper, an American missionary at Huahine, Society Islands, and is kindly furnished us by Dr. R. E. C. Stearns.—*Editor.*]

Andrew Garrett, a celebrated conchologist, died at his residence on the Island of Huahine, Society Group, South Seas, on November 1, 1887, in the sixty-fifth year of his age. For some months past he had suffered from a severe form of cancer in the face, which at last brought about his death. Mr. Garrett was the third child of a family of fourteen, and was born on April 9, 1823, in Beaver street, Albany. His mother was Joanna Van Neah Campaneaux, a native of Belgium, of good education and speaking several languages, and his father was Francis Garrett, a native of Canada. Both parents lived to old age, the mother attaining seventy-two years and the father eighty-four years. The early life of Andrew Garrett was spent in Vermont, where he very soon manifested a decided scientific turn of mind. On one occasion, when eight years of age, he left home without warning, to visit a museum about one hundred miles away. He accomplished his object and returned home in safety. He had a great fondness for travel, and to satisfy the longing, he went to sea at the age of eighteen years. As a shell collector he made his first acquaintance with the South Pacific in 1848, and in 1852 he ultimately adopted that Island-studded ocean as his special field of research. Since that time Mr. Garrett has visited almost every island of note in the various groups of the South Pacific, spending considerable time in each group. His studies not only embraced shells of the marine, fresh water and land orders, but also birds, fishes and other objects of natural history. For one period of ten years he was professionally engaged in the interests of the Godeffroy Museum, Hamburg, during which time was published 'Andrew Garrett's Fische der Südsee,' in six parts, edited by Dr. Albert Gunther, of the British Museum. Mr. Garrett was also for a time associated with Professor Agassiz. In addition to visiting and residing in every group of islands in the South Pacific,

Mr. Garrett visited and explored many parts of the Atlantic and Pacific coasts of South America, the East and West Indies, the Sandwich Islands and some parts of the United States. His diligence and learned researches, soon gave him a place as an authority among conchologists—an authority now everywhere recognized. His correspondents were very numerous, residing in every part of the world. Mr. Garrett's private collection of shells (now on sale) consists of over 8000 species and comprises over 30,000 examples, representing almost every known part of the globe. Of this collection Mr. Garrett himself collected over 4000 species. He was a corresponding member of the California Academy of Sciences, and of the Philadelphia Academy of Natural Sciences. The following is a list of Mr. Garrett's principal writings. In the proceedings of the Zoological Society, London: A list of Mitridæ collected at Rarotonga, Cook's Isles; descriptions of two new species of Separatista; of two new species of Cœcum; a new species of Scissurella; on the terrestrial Mollusca of the Viti Islands. In *The Quarterly Journal of Conchology*, Leeds, England: 'Occurrence of Crepidula aculeate at the Marquesan Islands'; 'Occurrence of Gadinia reticulata in Eastern Polynesia;' 'Annotated catalogue of the species of Conus collected in the South Sea Islands;' 'Catalogue of the Polynesian Mitridæ, with remarks on their geographical distribution, station and position of a supposed new species;' 'Annotated catalogue of the Cypræidea collected in the South Sea Islands.' In *The American Journal of Conchology* vol. VII.: Descriptions of new species of land and fresh water shells from the South Sea Islands;' 'List of Viti Bulimus and descriptions of new species.' In proceedings of the California Academy of Natural Sciences: 'Description of new species of shells inhabiting theSandwich Islands;' 'Descriptions of new species of fishes inhabiting the Sandwich Islands;' 'Descriptions of new species of South Sea Shells.' In the proceedings of the Academy of Natural Sciences, Philadelphia: 'On the terrestrial Mollusca Inhabiting Cook's Island, Society Islands and Samoan groups;' 'List of land shells inhabiting Rurutu (one of the Austral Islands) with remarks on their synonyms and geographical range.'

FOSSIL BOTANY—IV.

There seems to have been a well marked and close relation between the more recent fossil plants of California, and the present flora of the Gulf States, indicating a more humid atmosphere during later pliocene times.

Perhaps the fact that a species of fern (Aspidium patens, *Swtz.*) growing in a canyon near Santa Barbara, California, and not found at any other point in the United States west of Florida and Texas, is an instance of the holding over of a species, which is becoming extinct in the western portion of the continent, is one of

the last links connecting the fern floras of the two extremes, east and west, and showing the succession of types connecting the present with the past. Geology teaches us that at various times in the world's history, the floras of regions of greater or less extent have, from various causes, been destroyed ; for example : Toward the latter part of the Tertiary period, the flora of a large portion of Central California was annihilated by extensive volcanic eruptions, which covered the surface with ashes and molten lava. Fossil remains of trees and plants of that period have been found in deposits under the lava; some of these have been determined as belonging to genera, quite different from those now found living in California, and most resembling plants of the later European Tertiary species.

These fossil plants are specially interesting to palæontologists and ethnologists. To the palæontologist, because animal life is preceded and explained by vegetable life. To the ethnologist from the plants having been found in deposits containing human bones and other evidences of man's occupancy of the region, at and previous to the time of the volcanic eruption. (See my article on 'Pre-historic California,' read before the California Historical Society, January, 1888.)

After a lapse of time necessary to form new soil and restore atmospheric conditions favorable to plant life, the places of the plants destroyed were, either by plant migration, natural distribution, or by evolution, subsequently occupied by other and different species.

Whether the succession of species was due to the gradual changes and modifications of earlier forms, or to the spontaneous generation or production of new forms, is a question upon which there is great diversity of opinion among men who have been close students of nature.

A notable instance of this character in England is that of the Isle of Sheppey, at the mouth of the Thames, where large quantities of fossil remains of fruits, tropical plants, fishes, turtles, shells, etc. are continually washed out on the sea coast. Among them large numbers of fruits of palms closely allied to the Nipa Palms of the Moluccas and Philippines.

The character and position of the numerous marine and fresh water genera, in the eocene clay, show that this celebrated fossil deposit was formed in the delta of an immense river of eocene times, which probably flowed from near the Equator toward the spot where these interesting remains are now so abundant. This river was lined along its banks by magnificent tropical vegetation, and the country inhabited by curious birds, reptiles and mammals, while the waters teemed with sharks and fishes.

Among the most interesting fossils of the writer's collection are fine specimens of the fruits and seeds of eocene palms from this locality.

In 1840, Mr. J. S. Bowerbanks published a work on the ' Fos-

sil Fruits and Seeds in the London Clay,' which, so far as published, consists of 144 pages, with seventeen plates, containing a large number of figures, in which are described thirteen species of nipatites, and many species of interesting and curious genera of extinct fruit and nut bearing trees.

The predominating types of animals of the period on this continent were dinosaurians, mixed with the remains of crocodiles and many curious forms of animal life which are now extinct. The waters of the Eocene Sea were inhabited by the huge zeuglodon, a cetacean whose fossil remains are abundant in Alabama; one skeleton was formerly on exhibition at St. Louis, which measured seventy-five feet in length.

The development and succession of plant life can only be understood by the researches of the vegetable palæontologist, hence this branch of science is rapidly gaining enthusiastic exponents, and its importance is being recognized by scientists generally.

There is great diversity of opinion in relation to the migration of plants in former ages. The comparative study of the fossil botany of North America, Europe, Africa and the intervening islands located between these points, has given rise to much discussion among scientists, many of whom argue that the comparison of the fossil plants of these regions point to a lost continent, which is now submerged beneath the Atlantic Ocean, and which, during the miocene period furnished a continuous land surface, over which the various plants, which were common to the now widely separated continents, passed freely; others claim that the plants migrated from America westward by way of Japan.

The greatest affinity seems to exist between the fossil plants of the miocene period of Europe, and those found living on the eastern slope of North America.

During the miocene, there existed in Europe, many generic types of plants which are now peculiar to America, and during that period the climate of Europe was probably much hotter than now, and supported a heavy growth of vegetation which furnished the material for the extensive lignite beds of that region.

SANTA BARBARA, CAL., Jan. 1888. *Lorenzo G. Yates.*

CHARLES H. MAROT, the well-known publisher of *The Gardener's Monthly and Horticulturist*, died, after a few days' illness, December 21, 1887, in his sixty-second year.

ASA GRAY died at his home at Cambridge, Mass., January 30, 1888, in his seventy-eighth year. We had hoped to pay a further tribute to the memory of this illustrious scholar and genial man, whose death is sincerely mourned throughout the civilized world, and in whom every American botanist has lost a personal friend. His European co-laborers delighted in styling him the 'Linnæus of America.'

A SHARP FAMILY—THE CACTUSES.—III.

BISHOP'S HOOD CACTUS.

Astrophytum Myriostigma, the Bishop's Hood Cactus, is of very peculiar aspect. It is seldom seen in collections, but when present is one of the most conspicuous. At a glance it scarcely appears to be a living plant, so regular, rigid and unplant-like is its form, and one might almost imagine that it had been carved from a piece of stone. The genus is closely related to Echinocactus, but differs from other cactuses in the absence of spines or tubercles, being entirely bare except for some curious star-like scales or hairs. It is seldom more than 6 or 8 inches high, by 3 to 5 inches in diameter, and has 5 or 6 broadly triangular ridges one or one and one-half inches deep, with an even surface, the edge devoid of spines. Upon the surface are a number of small gray or whitish flattened scales or hairs, which are thickly placed on the young growth, but fall off as the plant advances in age, and the lower part of the stem is sometimes quite bare. The flowers are produced near the summit of the stem, generally several together, which open early in the day and close in the afternoon, expanding on each succeeding day for nearly a week. According to Blanc it will bloom from June to September in cultivation.

DISCOCACTUS, PFEIFFER.

This genus contains two or three species of dwarf, semi-globose plants, resembling Echinocactus somewhat. D. Biformis is the only species known to me.

THE MELON CACTUS.

We select the following from 'Hints on Cacti,' (copyrighted 1886, by A. Blanc & Co.):

About thirty species of plants found in the West Indies and tropical America are arranged under the genus Melocactus, and resemble each other closely in their leading characters. These are a globose unbranched fleshy stem, 1 to 2 or 3 feet in diameter, regularly ribbed from base to summit, the ridges bearing a varying number of clusters of spines and a cylindrical portion, termed 'the cap,' produced from the apex of the stem, formed of a wooly substance, and closely set softer spines than those on the main stem. Upon this the small flowers are borne, tabular in form, and red or rose-colored. All the species are natives of

hot regions, generally growing in rocky or sandy situations exceedingly dry, but a few are said to be found near the coast, or in salt marsh districts. Only one species, M. Communis, is in general cultivation, and as a curiosity it is remarkable.

A high temperature, very porous soil, abundant drainage, and little water are the chief points requiring attention in its culture, and when a plant assumes an unhealthy appearance water must be withheld.

Turk's Cap, Englishman's Head, and Pope's Head are some of the popular names that have been applied to this plant, all referring to the peculiar crown on the summit of the stem, a character by which it is easily recognized. It is found in several of the West Indian Islands, particularly on the island of St. Kitts, where it grows in large quantities in barren, rocky districts. Specimens exceeding a yard in diameter are not uncommon, and some are reputed to be two or three hundred years old. Cattle and mules are said to eat the plants after removing the spiny outer portion with their hoofs, as the fleshy substance of the stem affords a welcome supply of moisture. *C. R. Orcutt.*

THE STUDY OF RIVER GEOLOGY.

I wish in this paper to say something to those of you who are simply beginners in the study of geology, but who have taken such an interest in the work as will lead you beyond the illustrated text-book and the comfortable fireside into the field.

There are few students who are not bewildered upon their first entrance into field work with the question of just what to study, and yet almost all of such inquirers are living at least within easy walking distance of a river or small stream, and a careful study of the phenomena to be observed here will give a clear insight into several features of perhaps the most fascinating branch of Geology—the dynamical; and here instead of detailing some of the results of past study in this direction, I wish to outline for you the manner in which you can set to work for yourselves.

As a general rule a river, considered as a whole, consists of the bed, or that part occupied by the stream at ordinary stages of the water, which is defined on either side by the level alluvial flood plain, which is only covered at time of high water, and in many cases there are constructions called terraces, similar to the flood-plain in general character, at various elevations on the sides of the valley which make it evident that the stream has at some time been running at a higher level than at present, and has been deepening its bed in the course of past time as rivers are doing to-day.

Now, in the first place, you will discover all you can of the physical geography of the country which the stream drains; n ot-

ing the average slope of the surface, which, if you are not prepared to take it for yourself, may be determined approximately from the various railroad surveys in the region.

Note, also, the general character of the soil in the country drained and of the material through which the stream has made its bed, whether rocky, sandy or clayey, for upon these things will depend its power of cutting down or eroding the land surface, and upon this erosive power of river systems are based many of the estimates of the length of time necessary for the accumulation of sedimentary rocks.

You will also determine the velocity of the stream and the weight of the sediment which is deposed from a stated amount of water at various stages and at different times of the year, both from simple mechanical suspension when the water is dipped up and the foreign matter allowed to settle, and from solution upon evaporation. By determining the velocity of the stream, its width and mean depth at any point, you can estimate, at least roughly, the amount of water which will pass this point in any given time, and by ascertaining the amount of solid matter carried in each gallon of water you will know approximately the amount of matter carried by the entire stream, and from this, if you know the area of the surface drained by the stream you are studying, you can find the average depth to which this general land surface has been eroded during, say, the past year, or last century.

Of course these estimates should only be based upon observations made at various times of the year, as the amount of water, velocity and consequently the amount of matter carried will vary greatly with the seasons.

Study the extent and character of the flood-plain and notice if there are terraces or other evidences of the former action of the stream at higher levels, and if you find such deposits, note the physical character of each, as compared with the others, and if you find in them remains of plants or animals; determine whether they belong to recent species or not, and if you are near the coast, whether such species are marine or fresh-water.

You will also find it a matter of much interest to note the way in which sand-bars are formed under the influence of the currents, especially where there is a bend in the stream, in which case the velocity of the current and the angle of the bend should be noted in connection with the character of the bars formed.

When bends occur, bars will be formed on the *inside* of the curve, while the opposite bank will be cut away.

Then where a tributary stream flows into the main one, you will study the character of the bed and the way in which sediments are deposited, and lastly, going into the mathematics of geology, you will be much interested in studying the law of trans-

portation, or the comparative amounts of sediment carried as the velocity of the stream changes.

These are only general suggestions, rather than directions which you are to follow to the letter. As you progress with your work you will find new questions arising, depending much upon your locality, and you will see that the peaceful, laughing stream which has been flowing by you almost unheeded in the past can propound deeper riddles than the Sphinx.

W. R. Lighton.

NECROLOGY.

James Carson Brevoort, in whose honor the beautiful Californian genus Brevoortia was named, of Brooklyn, N. Y., died December 7, 1887, in his seventieth year. He was a member of the New York Academy of Sciences, and a generous patron of literature, science and art. He endeavored to make his knowledge of practical use to the community in which he lived.

James Reid, a prominent florist, died on November 17, 1887. 'He was among the foremost in elevating floriculture to the high position it now occupies in public estimation'.—*Thomas Meehan.*

ORIGINAL BIRD NOTES.

Alfred Hills, Marston, England, found a partridge nest on January 23, 1886, with a fresh egg in it. That night a snowstorm came and filled the nest, which the bird then forsook.

G. D. Story.

A raven once made an unexpected dive from a tree upon a big drake that was swimming. The drake was scalped and killed at the same time. *London Field.*

A golden-winged woodpecker was known to lay seventy-one eggs in a single season at Dighton, Massachusetts. An ornithologist kept robbing its nest of all but a single egg, and the poor bird kept laying in order to raise a brood. *G. D. Story.*

The Screech Owl. This little owl is found in nearly all parts of the United States, but is much more common in northern than in southern sections. The screech owl is by no means rare in Vermont, and many a Green Mountain lad, as he has been passing through a wood on a dark night, has felt his hair rise and his heart leap, and directly after found himself flying as upon wings of the wind at the terrific scream of this bird, perched on a tree just over his head. Their nest is made of grass and feathers and is placed at the bottom of a hollow tree or stub, often not more than six or eight feet from the ground. The eggs are white, of a globular form, and usually four or five in number. It is sometimes called the mottled owl. "*Vermont.*"

A GLANCE AT BOOKS.

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VOLUME IV. WHOLE NO. 35.

THE

West • American • Scientist.

MARCH, 1888.

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THE WEST AMERICAN SCIENTIST.

VOL. 4. MARCH, 1888. No. 35

GEORGE W. TRYON, Jr.

On Sunday afternoon, February 5, 1888, George W. Tryon, Jr., died at his home in Philadelphia. Coming so soon after the death of Isaac Lea, this sad event has quickly deprived that city of the second of its noted conchologists. Mr. Lea, however, lived to a good old age, and his life work seemed complete and well rounded out; but Mr. Tryon died in the prime of life, with his last and greatest work but half finished. He was not quite fifty years of age, having been born May 20, 1838, but his life was one of great activity, and his published works are important and varied.

His whole life was spent in the neighborhood of his birthplace, and his early education was obtained at Friends' school. Entering into business with his father, who was a gun-smith, he continued to devote spare time to his studies, and became greatly interested in natural history. The study of shells at length so fascinated him, that in 1867 he withdrew from business and concentrated his energies on his chosen science, in which he soon became eminent. His earlier writings were chiefly published in the '*American Journal of Conchology*,' which he established in 1865, and of which seven volumns were published.

After writing various extensive works on American Mollusca, in 1883, he published his "Structural and Systematic Conchology," which, large as it is, was designed to be but an introduction to the great work of his life, namely, the "Manual of Conchology, Structural and Systematic." The first volume of this series was issued in 1879, and up to the time of his death, twelve volumes had appeared. It was estimated that about thirty volumes would be required to fulfill the purpose of the author, which was nothing less than to describe and figure every known species of mollusk which now exists anywhere in the whole world. Four lithographic artists were constantly preparing plates, while Mr. Tryon most industriously studied the shells and wrote the descriptions.

His basis for comparison and study was the extensive collection and library of the Academy of Natural Science, to both of

which he had contributed very largely, both in labor and material.

It may here be remarked, that though men may die, their works live, and the Academy has already taken steps to have the Manual continued.

Mr. Tryon's illness was of brief duration. About a week before his death he was seized with an attack of what was believed to be asthma, and from which he was recovering; when a sudden failure of the heart showed itself, and soon he was free, 'Leaving this outgrown shell by life's unresting sea.'

Josiah Keep.

THE VIOLETS OF BRITISH COLUMBIA.

Viola biflora, Linn., very rare near Stuart Lake, B. C.

Viola blanda, Willd., sweet white violet, found here and there in the province.

Viola canadensis, Linn., Canada violet. In the forests of B. C.

Viola canina, Linn., var. Sylvestris Regel., Dog violet, in the swamps near the ocean.

Var. longipes Nutt., through the Rocky Mountains to Donald in the Columbia valley, Cedar Hill near the city of Victoria, B. C.

Var. rupestris, Regel., in the Rocky mountains.

Viola cucullata, Art. Common Blue violet. In wet meadows of the province.

Viola glabella, Nutt., Western yellow violet. In the valley of the Fraser, at Port Moody and near Mount Finlayson near Victoria, B. C.

Viola nuttallii, Pursh var. lingaelfolia Nutt. around Victoria.

Var. proemorsa, Watson, near Victoria.

Viola adorato, Linn., English sweet violet, escaped from gardens near Victoria.

Viola palustris, Linn., marsh violet. Vancouver Island and Peace River.

Viola renifolia, Gray, Kidney-leaved violet. In swamps and wet meadows of B. C.

Viola sarmentosa, Dougl. In the valley of the Fraser and near the city of Victoria.

Viola selkirkii, Pursh, Great spurred violet. In Selkirk mountains.

M. Lopatecki.

THE NEW CHINESE WEEPING LILAC.

Some years ago, seeds of a species of lilac, new to cultivation, were sent from China by a botanist traveling there, and produced plants of a habit of growth midway between the common lilac and the ligustrums. They were all somewhat fastigiate but one, and that one is the subject of our story.

It grew with much the form of Forsythia Suspensa, and trailed

upon the ground. By grafting this upon selected stems of common lilac, is easily produced the beautiful little tree which the accompanying electrotyped photograph shows. Its habit is wholly pendulous, and its branches are long and very slender, and curiously set with pairs of opposite leaves, which stand out

THE NEW CHINESE WEEPING LILAC.

horizontally like pairs of wings, thus giving the plants a light and airy style, which is very attractive. The size of the tree is about the same as the well known Kilmarnock willow, which is the most useful size for gardens and small lawns.

Since the first appearance of the 'Cut Leaf Weeping Birch' no new weeping tree has had such a decided sensation among

both nurserymen and amateurs as this Weeping Lilac. Its exceeding gracefulness of form; its curiously arranged leaves, in pairs and set like a bird's wings in flight; its white blossoms, which deck it with honey-scented clusters of flowers, such as no other weeping tree can boast; these things make it the most unique of all this highly decorative and popular class of trees.

The lilac is beloved by everybody. It is associated with our earliest remembrances of blossoms, and it has a hold upon the imagination and the affection of all, as strong and as tender as its fragrance is distinct. The first shrub that our ancestors brought from England and planted by their new thresholds was the purple lilac.

Newer trees and shrubs were added, but none of them could fill that fragrant corner in the heart held by the old 'common lilac.' It is surely this deep feeling that has at once appropriated the 'Weeping Lilac' and given it such a welcome.

This interesting tree received a first-class certificate of merit from the Massachusetts Horticultural Society, and is introduced and for sale only by the "Shady Hill Nurseries," Cambridge, Mass.

[They issue a large illustrated catalogue with colored plates of this and other novelties, free to all. Send them your address.—EDITOR.]

SCIENTIFIC MISCELLANY.

M. Lopatecki reports two curious insects from the west waste of Central America. One of them is Ageronia feronia, a remarkable species, being only one butterfly or moth with the exception of the European-death-bed-hawk-moth, which is capable to bring forth sound at will. The insect is whitish gray, with dark brown curves and lines, and sits head downward, with expanded wings, against a branch of a tree of its own hue. When approached it will rapidly fly off, producing on the wing several sharp and very quick sounds.

The other insect is of the family Anoea, and with closed wings resembles exactly the color of the leaves of its food plant to such perfection that even at a very short distance it is scarcely possible to recognize it. The first of those insects M. Lopatecki observed near San Juan del Sur, in Nicaragua; the second one in San Lorenzo, in the Republic of Honduras, though the natives assert that those insects are to be found all over Central America on the Pacific and on the Atlantic coasts.

The most numerous family is, without question, the insect world. President Sharp, of the London Entomological Society, states that, while Linnæus knew only 3,000 species of insects 120 years ago, the collections of the world probably include at present 200,000 or 250,000 species. Certain data lead to the inference that we do not yet possess more than one-tenth of those existing,

so that even the present rapid rate of discovery will not complete our collection of insects in less than 1,000 years. Before the end of that period many species of to-day will have become extinct, and Dr. Sharp urges that those likely soon to disappear should be especially sought.

An interesting problem to astronomer and philosopher is the remarkable ring of minor planets traveling in orbits between those of Mars and Jupiter Over 270 of those little objects have been discovered, and Prof. Daniel Kirkwood now gives the encouraging assurance that the number unknown is practically unlimited. He shows that Jupiter is probably tending to reduce the number by increasing the eccentricities of their orbits until their perihelion distances fall within the sun itself. He believes that several of our periodical comets may have been asteroids, drawn from their orbits in this way.

Two telegraph wires, each about six miles long, are to be laid in Spain expressly for studying earth currents and atmospheric electricity. The lines will cross each other at the astronomical observatory of San Fernardo, one running due east and west, and the other due north and south.

The channel of the Congo can be traced for a hundred miles out to sea as a remarkable submarine valley, having a depth of 1,432 feet just at the river's mouth.

A curious speculation has been made concerning what would happen were the earth's rotation to cease. The equatorial diameter being twenty-six miles more than the polar diameter, the earth would present an equatorial zone of solid ground miles high above sea level, the water being drawn to the poles. This land zone would then be like our artic regions, and would be banded by a ring of permanent ice and snow.

COLIAS EURYTHEME, BOISDUVAL.

Ever since the summer of 1877, when my eyes were gladdened by the profusion of Colias edusa in Kent and Sussex, England, the genus Colias has had a kind of fascination for me. But it was not until last year when I made the acquaintance of Colias eurytheme, C. Meadii and C. Alexandra in this country, that I fully understood the extreme interest attaching to the various forms of Colias, and most of all to the polymorphic C. Eurytheme. This species may be considered to belong to the central region of North America, though it exists to the Pacific, and occasionally occurs as far east as Massachusetts, as well as in Ontario and Quebec. It is double-brooded, and so different is the spring from the summer race that it was formerly considered a distinct species, Colias Keewaydin. There are also two other distinct forms, called ariadne and eriphyle, and the last was like Keewaydin, supposed

a good species, until Mr. W. H. Edwards proved otherwise by breeding eurytheme from eggs laid by C. eriphyle. The earliest spring form in Texas and California is ariadne, a smallish butterfly, about an inch and a half across the wings, pale sulphury with orange patches on the fore wings, and the dark marginal borders are ill-developed. A little later in the same localities, or as the only winter form further north, comes Keewaydin, much like Ariadne, but slightly larger, duller in general color, with the orange patches more suffused over the wings, the under side also is decidedly more ochreous, that of Ariadne having a tendency to greenish, with rosy fringes Then the summer form Eurytheme type is much larger, over two inches in expanse, and vivid orange, the sulphur yellow only appearing on the costa, the inner margin of the secondaries, and the yellow spots in the marginal band of the female. The under side is more like Keewaydin than Ariadne. In this locality (Swift Creek, Custer Co., Colo.) another very different form, which I will call intermedia, is found flying in the summer. It is larger than Keewaydin, the expanse of wings in the female being over two inches (about fifty-five millimeters), the color of the wings is pale sulphur, with distinct orange patches on the primaries, much as in Ariadne, but the wings are much suffused with black scales near their bases; the marginal borders are fairly well-developed. The under side is pale greenish yellow, not ochreous, as in eurytheme type and Keewaydin, nor have the secondaries the greyish appearance of Ariadne. The fringes are only slightly rosy. So much for the orange forms of eurytheme; there is yet another, of a delicate sulphur tinge, almost like C. philodice, and this is called eriphyle, Colias hagenii being also a synonym. This form eriphyle flies with the orange varieties, and is itself seasonally dimorphic, as pointed out by Mr. W. H. Edwards ('Canad. Ent. 1887, p. 173). On November 9, 1887, I caught a female specimen of the autumn brood of eriphyle in this locality. This may be called autumnalis, and has much the same relation to typical eriphyle as Ariadne has to typical eurytheme (vide W. H. Edwards, loc. cit.), being smaller, with narrower borders, and the hind wings more greyish-green. Whitish females occur of eurytheme, Keewaydin and intermedia, resembling analogous forms in other species of the genus, these may be called pallida. The forms, then, of C. Eurytheme may be classified as follows:

Colias eurytheme Bdv. a. orange forms.

I. Spring or winter forms.
   1. Ariadne Edw.
   2. Keewaydin Edw.
      a ♀ pallida.

II. Summer forms.
   3. Typica=Eurytheme Bdv.
      a ♀ pallida.

4. Intermedia Ckll.
   a ♀ pallida.

C. Yellow forms.

5. Eriphyle Edw. (type.)
6. Autumnalis Ckll.

In conclusion, I may say that I shall be greatly indebted to anyone who will send me specimens of this species from any locality, with date of capture and other particulars appended, for the further study of its variation. *T. D. A. Cockerell.*

West Cliff, Custer Co., Colorado, March 9, 1888.

CANADIAN FILICINEÆ.

In the 'Transactions of the Royal Society of Canada,' 1884, Messrs. John Macoun, M. A.; F. L. S.; and Dr. T. J. W. Burgess, M. B., gave an interesting exposition of the ferns of Canada. In an introduction which evidences thorough knowledge of this class of plants of the Dominion, and a love of the beautiful in nature, the authors give a succinct history of the Pteridology of the country, and tabulate the then known Canadian species and varieties, according to the classification of Mr. Redfield, as follows:

First—Cosmopolitan.
Second—Boreal.
Third—Appalachian.
Fourth—Pacific.
Fifth—New Mexican.

Omitting the sixth class,—Tropical,—and adding a class showing such of the Canadian species as are peculiar to North America.

Of the sixty-four species and varieties tabulated, as known to grow in the Dominion, we find four that are 'Cosmopolitan,' or widely distributed over the globe, in temperate and tropical regions; twenty-three in the second class, which inhabit the northern regions of the globe; twenty-six in the third class, extending though the hilly regions of the United State east of the Mississippi, northward into Canada; some of them also in the Old World; ten in the fourth class, extending along the Pacific Coast, from California to Alaska; one species (Cheilanthes lanuginosa, Nutt.) is included in the fifth class; twenty species are peculiar to North America.

In a 'Synopsis of Canadian Ferns and Filecoid Plants,' by George Lawson, published in 1864, the number of ferns, including Ophio-glossaceæ recorded, was fifty.

In the work under consideration, there are sixty-four species, and nine distinct varieties, which are distributed in five botanical areas, namely:

First—Atlantic provinces and Eastern Quebec.

Second—Ontario and Western Quebec.
Third—The Great Plains, north to the Arctic Circle.
Fourth—Rocky Mountains.
Fifth—British Columbia.

The species and varieties found in the different areas are, in the first, fifty-four; in the second, fifty-five; in the third, thirty-one; in the fourth, twenty-seven, and in the fifth, thirty-one.

The general remarks and explanation of the development of ferns are very interesting. Then follows a 'Synopsis of Genera' from 'Eaton's Ferns of North America,' so far as the same is applicable to Canadian species.

The description of species are comprehensive, and the references to other publications quite extensive, while the book is filled with interesting remarks on the species and varieties, and notes of localities where found, with the names of the collectors, and altogether is one of the finest additions to fern literature which has come under our observation.

Ferns are generally considered as having no commercial value, but these authors, in connection with the description of Pteris aquilina (the common brake or braken), one of the most universally distributed of all ferns say, 'that, no other fern possesses so much economic value as Pteris aquilina, the young fronds and root-stalks have been used as food by the inhabitants of different countries, and the dried fronds, chopped up with hay or straw, are, in Wales, given as fodder to horses; the ashes, which contain a large amount of alkali, have been used by glass-makers, and in Switzerland the potash is extracted for commercial purposes; the plant has been employed for thaching, also for fuel, and as packing material for fruits; while in medicine the root is, by some, considered extremely valuable as a vermifuge.'

In a supplementary article, published in the transactions of the same society, in 1886, Dr. Burgess gives some important recent additions to the list of the recorded Canadian species and varieties.

Adiantum pedatum, L. variety rangiferinun. Burgess, so-called from the resemblance of the pinnules to the horns of the reindeer, discovered near Victoria, British Columbia.

Aspidium aculeatum Swz. variety lobatum, Kze.; British Columbia.

Aspidium oreopteris, Swz. British Columbia.

Two varieties of Botrychium ternatum, var., from Rupert River, N. E. Terr. var. Anstrale, from Vancouver's Island, B. C.

Onoclea sensibilis, L. variety obtusilobata, Tarr. from New Brunswick.

Polypodium vulgare, L. variety Cambricum, Willd. (the P. Cambricum L.) British Columbia.

Scolopendrium vulgare Sm. var. marginatum, Moore, variety ramosum, Gray; and var. multifidum, Gray. The last are from New Brunswick. *Lorenzo G. Yates.*

SANTA BARBARA, CAL., February, 1888.

A DOG AND HIS PLAYMATE.

Where I am boarding, at Camp Sargent, California, lives a great, buffy-brown, curly-haired dog, and the funniest thing about him is the way he carries on with his little playmate, a half-grown kitten almost the same color as himself.

The big fellow is so large that his honest and good-natured attempts at play are often hardly appreciated by Miss Pussy. He will pick her up and carry her all about the yard with the cat's head fairly inside his great mouth. But when the playful fellow drops her on the ground again she is never injured and never attempts to retaliate for the atrocious liberties he takes.

Then he pretends he is going to eat her up altogether and throws his immense paws around her neck, in a very dangerously loving manner for the cat, I have thought.

But as pussy rather likes his rough play after all no one interferes, even when strangers declare that the irrepressible dog is 'a'murdering the cat.' Doggie and his lady-love are seen together almost all the time and take their meals from the same plate. At night times and on rainy days, the kitty is almost always found cuddled up fast asleep in Rodger's fluffy curls, so it must be a case of true-love between them sure enough.

Harry R. Taylor

ALAMEDA, CAL.

EDITORIAL.

A few words of explanation we deem due our readers. Our January number was not issued till into February, the February number until late in April; in consequence our March and April numbers are delayed and will be necessarily issued almost simultaneously. This delay is mainly due to the mechanical department, changes in the office of our printer and the press of work at his office during the first of the year. We hope for greater promptness in the future.

Another word. The editor has had for some months not only the entire editorial work connected with several papers and magazines, three monthlies and one weekly, but also the greater part of the business management. He is now relieved of the latter work and can give more attention to other duties. The financial support of the *West American Scientist* is not so great at present as it should be and we trust its friends will endeaver to correct this evil by increasing its subscripton list and the advertising patronage, now sufficiently large to allow of our publishing a magazine twice as large as we are now able to do, if prompt payments and renewals were the rule.

We regret to chronicle the death of our friend and correspondent, George W. Tryon, Jr., the eminent American conchologist

and author of many works on that subject. Prof. Keep contributes a brief sketch of his life in this number.

We are indepted to our talented friend, Maurice Lopatecki, for several interesting articles on the natural history of British Columbia, and also to Dr. L. G. Yates and T. D. A. Cockerell, for valuable contributions.

We are far behind in giving literary notices, but will soon be able to make due acknowledgements and reviews of those deserving.

CLOSE OF THE CENTURY'S 35th VOLUME.

The April number of THE CENTURY closes the thirty-fifth half-yearly volume. The first article is by Edward L. Wilson, the well-known photographer, and is descriptive of the natural and other features of Palestine 'From Dan to Beersheba.' The article has a great number of illustrations, mainly from photographs, and will be of special interest to the teachers and students of the International Sunday-School Lessons.

Theodore Roosevelt, in this number describes, with the aid of Mr. Remington's well-informed pencil, that decidedly American institution, 'The round-up ' As Mr. Roosevelt and Mr. Remington have both participated in scenes such as are here depicted, the paper is unusually vivid both in letter-press and illustrations.

An illustrated article on 'The American Inventors of the Telegraph' tells the inside story of the invention, especially bringing out the services rendered to the enterprise by Alfred Vail. Mr. Vail's extremely important connections with the invention is here for the first time fully and authoritatively told. The article will be a surprise to the larger part of the public.

Two articles of special literary interest are Henry James's paper on Robert Louis Stevenson, with a sketch of Stevenson's very individual face by Alexander, and a brief essay by the Rev. T. T. Munger on 'The Works of Elisha Mulford.' Mr. James does not speak of 'Underwoods' in his essay, it having appeared since the paper was written; but there is a poetic criticism of it in 'Bric-a Brac,' by Miss Thomas.

Dr. Eggleston's story of 'The Graysons' has some very exciting chapters, and James Lane Allen's story, illustrated by Kemble is a pathetic account of 'Two Kentucky Gentlemen of the Old School.'

ST. NICHOLAS FOR APRIL, 1888.

The April ST. NICHOLAS has a seasonable frontispiece by Fenn, two toddlers under an umbrella, on 'An April Day.' This introduces the opening article 'What Makes it Rain?' by George P. Merrill. There is also a charming 'Rhyme for a Rainy Day' by Julia M. Colton, artistically framed by Katherine Pyle.

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THE

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APRIL, 1888.

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VOL. 4. APRIL, 1888. No. 36

A NIGHT WITH THE STARS.

Soon after sunset we ascended Prospect Hill, on the brow of which stands our new observatory, and prepared to spend a portion of the night in contemplation of the heavens. It was the time of early spring, and as we looked off from the summit of the hill the surface of the earth seemed very fair. We were standing upon the first elevation that rose up from the level valley, and in front of us the green plains stretched away to the blue waters of San Francisco Bay. On the right were seen portions of three cities, the great metropolis and its vigorous young neighbors, Oakland and Alameda. As darkness began to settle down, the electric lights flashed out sharply in the distance from many lofty towers like stars of the first magnitude, while many lesser lights from gas jet, lamp and candle, could be seen twinkling like the feebler members of the constellations.

On the left, the broad valley could be seen, dotted with clumps of trees and checked by fences, and in the distance arose a nebulous glimmer from thriving villages embosomed in the midst of numberless orchards and market gardens; while against the northern sky, as a dark and solid background, rose the everlasting hills, diversified by a dark gorge and rounded knoll, and crowned by rough ledges and old trees. Just below us, in the center of the campus which itself is a little paradise, surrounded by trees and gardens and guarded by a merry brook on either side, stood the many-windowed college, all lighted up for the evening study-hour.

Such were the scenes which met our eyes as we paused for a moment before entering the neat building from whose tower we were to look far off into the clear sky. Earth was indeed very beautiful; but then it was very near and easy to observe. Yet as the twilight faded, things around us seemed more and more indistinct, while the glories of the sky shone out brighter and brighter. And so we turned away from the freshness of the spring landscape, and took in the situation of the heavenly bodies.

In the south was Orion, its chief stars keen and glittering, while the minor ones were just flashing out, or winking like sleepy children. Near by was Canis Major, in which shone the

royal Sirius, undisputed king of all the fixed stars. The western Zodiacal region was faintly luminous with that great cone of light so plainly seen at this season of the year, extending past the three stars of The Ram, almost up to the twinkling Pleiades. The other parts of the constellation, Taurus, were high up near the zenith, the most conspicuous star being the red Aldebaran. The Twins followed closely, and near the faint cluster of stars which mark the place of Cancer was seen the bright planet Saturn. To the east of this was the great sickle of Leo, and the last star of that constellation, Denebola, had just showed itself above the eastern hills. On the north were the ever-present attendants of the pole, Ursa Major, Cassiopeia and the minor constellations, while very near the zenith shone the circle of Auriga, with its star of the first magnitude, the bright Capella.

Having taken this general survey, a sight which is open to the observation of every one who is blessed with sight and who can view the open sky, we uncovered the great eye of the telescope and pointed the instrument toward the well-known nebula in Orion. We applied a low power, to give a broad field and plenty of light, and then we looked in silent admiration. Filling the whole circle of vision was a misty, luminous cloud, brighter near its center, and extending on either hand into fading wisps of light, which seemed to lie upon the dark sky like scatterings of white down. On the right side was a wide gap in the nebula, and the striking contrast between light and darkness made the sky behind this gap look like an inky space, deep and desolate. Several bright stars shone out in the midst of the nebula; one group of four, which seem very close together, is called the Trapezium. Under favorable circumstances two others are seen in this group, and lately, by the aid of the great telescope on Mt. Hamilton, a seventh has been observed.

From this, the most beautiful of nebulæ, it was easy to turn to Sirius, the grandest of the stars. As the tube came nearly into line with the beams of light which have for many months been hastening hither from that tremendous sun, lo, a bright dawn filled the field of the telescope! And then the orb itself shone out—brighter, keener, infinitely more full of white, hot energy than the electric light. Flashing, various and changing colors, splendid with the sharpest light conceivable, brilliant and lustrous as a diamond of the purest water, this magnificent star is doubtless the chiefest gem of all the sky.

The planet Saturn next claimed our attention, and in it we found a less brilliant, but equally beautiful object for observation. To the naked eye it appeared as a bright yellow star, but in the telescope we saw a luminous globe, surrounded by a shining ring a little inclined to our line of vision, so that it looked like a narrow ellipse. Steady and quiet, without the flashing splendor of Sirius, it shone in tranquil beauty, a mighty planet, surrounded by a

brilliant halo, such as the old painters placed around the head of the Holy One.

Having now examined the three most beautiful objects in the evening sky, we left the observatory for a few hours, till the rolling earth should bring into view new scenes of interest and beauty.

[TO BE CONTINUED.] *Josiah Keep.*

THE WEST AMERICAN MUSEUM.

It is considered advisable at this time to place a brief statement before the people of San Diego, and others who may be interested, relative to the plans of an institution that is soon to be organized and that is to have its existence in this fair city. Correspondence and consultations have been carried on confidentially with some fifty interested parties during the past few months. Very flattering encouragement has been received as the result. It is now desired to effect immediate organization; to facilitate the necessary preliminary work before incorporation a brief outline of the proposed institution is presented, that its friends may come forward and co-operate with us in the work.

OBJECT.

A Museum should contain the results of researches, should be a custodian of records and preëminently it should be a factor in public education. Indispensible adjuncts to a Museum are libraries, laboratories for the prosecution of original investigations by specialists, schools for the training of its own workers in the best methods known, and the publication of the results of its works and discoveries.

The work of the Museum is not intended to consist merely in the forming, preservation and accumulation of material (which is the ostensible aim); it is also intended to aid in the increase and diffusion of knowledge, to secure as complete data relative to each object as possible, and a new fact should be more highly prized than simple additions to the cabinets without corresponding additions to our knowledge.

The forming of collections is of inestimable value in facilitating the study of nature, science and history, and cannot well be overestimated, but it need not necessarily interfere with, or preclude equally important matters.

SCOPE.

It is not proposed to limit the scope of the Museum in any way. Its immediate field consists of the west coast of the American continent, extending from Alaska to Cape Horn. Arrangements are being made for the forming of large and exhaustive collections representing the fauna and flora, natural resources, pre-historic remains, etc., etc., of the two Americas.

Original investigations and extensive explorations will be con-

ducted at an early day, it is hoped, especially throughout interior Mexico, Central America and elsewhere.

The very comprehensive plan of the proposed Museum, if carried to completion, would rival any Institution in America, not even excepting the U. S. National Museum, in charge of the Smithsonian Institution. But such results require time for maturity. 'All things are possible' is an Arabic saying, and the little collection displayed on a tea plate a dozen years ago, grown to its present proportions, may yet rival the accumulation of ages under the genial skies of California.

THE ORCUTT COLLECTIONS.

The C. R. Orcutt Miscellaneous Collections will naturally be incorporated into and form the nucleus of the West American Museum of Nature and Art. These collections are estimated to contain over one thousand specimens, and are largely representative of the fauna and flora and other natural resources of Southern and Lower California. The herbarium is very complete; so also are the series of shells, fossils, minerals, etc., etc.

In addition to the plants of this region the herbarium contains plants from the Eastern States and Europe. The display of native grasses of San Diego and vicinity, awarded a diploma at the First Horticultural Fair held in San Diego, forms a portion of the herbarium and one feature of the Department of Economic Botany of the proposed Museum.

The Forestry Department, also connected with the Division of Botany, will be a special feature of the Museum, and it will be our policy to develop the local resources especially, after the plan of the Jessup collection in the American Museum of Natural History, of New York City. A fine series of wood sections of California, Eastern and West Indian trees and shrubs (also awarded a diploma at the first Horticultural Fair held in San Diego), and to which many additions have lately been made, forms a nucleus for this section of the Museum. The above series of woods is supplemented by a great variety of nuts and seeds from various parts of the world.

The work of the Department of Economic Botany will also include the introduction and distribution of seeds and plants, which will form a very important feature and materially aid in the establishment of a botanic and experimental garden in connection with the Museum. The wholesale seed and plant business, which has been conducted by C. R. Orcutt during the last eight years, will greatly facilitate the carrying out of very comprehensive plans relative to this work, and will render this department self-supporting should it be considered necessary or desirable by the management that it should yield an income.

THE LIBRARY.

An indispensible adjunct to a Museum is a library. At the present time, Pacific Coast students are compelled, in their prose-

cutions of original biological investigations, to consult Eastern, and in many cases, European libraries, from the lack of any libraries of note in California of a scientific character.

A feature that should be prominent in every library is the preservation of local history. No library is nearly complete without complete files of all the newspapers, magazines, and posters, and circulars, as it is possible to secure. Every book or other publication, containing even the slightest reference to the region, should be preserved, and especially all Government reports and scientific papers—often fugitive essays in foreign papers or magazines, or in the proceedings of some society far removed. These papers are often indispensable to the historical or biological student to avoid error, incompleteness and injustice to others in his own work.

The library of C. R. Orcutt contains some thousands of scientific books, pamphlet, stray papers, files of newspapers, and the files of scientific and other exchanges of the WEST AMERICAN SCIENTIST, which is being continually added to through various exchanges and purchases. In some respects the collection is unique and could not well be duplicated without great expense and trouble. Among the older volumes are two bearing the date of 1771. Some of the scientific books are valued as high as $40.00 for a single volume.

PUBLICATIONS.

THE WEST AMERICAN SCIENTIST will continue to be published monthly, and become the organ of the Museum. The influence of the magazine will be greatly to the advantage of the Museum at the start, and the exchanges with other magazines, individuals and societies, and literature received for review will very materially augment the library.

It will doubtless be found desirable to issue other series of publications such as bulletins, annual reports, memoirs, etc.; but these will not be immediately necessary. It will be best to establish a liberal system of exchanges throughout the United States and Europe, this often being the only way of securing invaluable publications of some foreign institutions.

EXCHANGES.

In addition to a system of exchanges of publications it will be necessary to arrange to exchange with other American institutions and individuals and foreign societies, sending them specimens of our plants and animals, minerals and fossils, in return for which they will gladly send us series for their own countries.

ORGANIZATION AND GOVERNMENT.

It is proposed to incorporate at an early date, under the laws of the State of California. The government of the Museum will be in the hands of a Board of Regents, consisting of ladies or

gentlemen chosen especially for their services in the cause of science, and who therefore seem suitable for the position. The number of Regents shall not exceed twenty-five at one time.

The general management and executive work of the Museum will be in the hands of the Director, who shall be responsible only to the Board of Regents, of which he shall be a member.

THE MUSEUM STAFF.

In addition to the officers and regents of the institution, there are more than a score of young men ready to enter the service of the Museum in any capacity, willing virtually to give their time to work. These stand ready to enter the field in making explorations and collections in any region we may designate as soon as we can guarantee their nominal expenses.

'It will not do to neglect nor slight these offers of services,' writes a friend of the institution, 'so willing to work hard and fare poorly, and with so good character and aims. These young men seem raised up for our work, and ready to give good aid from the start, and willing to do anything.'

We hope to receive sufficient encouragement and financial aid to very shortly avail ourselves of these offers of assistance and service which we have received from men of ability and experience—some even of national renown.

Further statements will be made in the near. A block of land valued at $20,000.00 has been donated for the site of the proposed Museum. Other donations of land, money, books or specimens will soon be in order.

THE TEA ROSE CRAB.

In 1862-3 this tree, Pyrus Malus Parkmanii, was received from Japan, by the late Col. Francis L. Lee, and by him given to Dr. Francis Parkman, in whose delightful garden it stands to-day. It is about 12 feet high, and full as wide, and has an exceedingly dense head of fine branches, resembling in its habit of growth a fine thorn. It has a remarkable habit of flowering the whole length of the past season's growth as well as from the older spurs, and each bud produces regurlarly five blossoms. These are set on stems three inches long, and so slender that they bend with the weight of the bud or bloom, in a very graceful fashion. The buds themselves are of a rich carmine color, and are in shape exactly like a choice tea-rose bud, only more slender, while full as long. They are almost precisely like, in color and form, the new tea-rose Pere Gontier, only not so large. This is a point of great importance in looking for a perfect apple blossom, as all others so far known, have the ends of the buds blunt and ill-formed. The fully opened blossoms are semi-double and of a lighter carmine color than the buds. The foliage is narrow, wedge-shaped, very firm, and quite glossy, being curiously dis-

tinct from all others of the apple family, and takes on in autumn the richest crimson and orange colors. The whole tree is a rich cloud of carmine colors, and the superb gracefulness of the whole is indescribable.

We are indebted to the Shady Hill Nurseries, Cambridge, Mass., for the beautiful illustration of this crab presented our readers this month. It is being introduced and is for sale by them. Our readers are advised to send them their address for their new catalogue containing colored plates of various novelties.

A NEW ROSE-GALL.

A spherical gall, an inch or more in diameter, is very frequent on the wild rose in this neighborhood. (Swift Creek, Custer Co., Colo.) Its surface is somewhat shiny, usually corrugated, in color reddish-yellow varying to pink and dull purplish. It grows surrounding the rose twig, so that it projects beyond and from the middle of the gall. In an old gall, from which most of the insects had escaped, I was fortunate in finding a dead and somewhat imperfect specimen of the imago, which is about three millimeters long, almost black, and shiny, with reddish legs and somewhat fuscous wings. I sent some of the galls to the Department of Agriculture, and Mr. L. O. Howard informs me that they are the product of Rhodites tuberculator Riley, Ms., an undescribed species. *T. D. A. Cockerell.*

West Cliff, Colo., March 12, 1888.

A NEW UNIO.

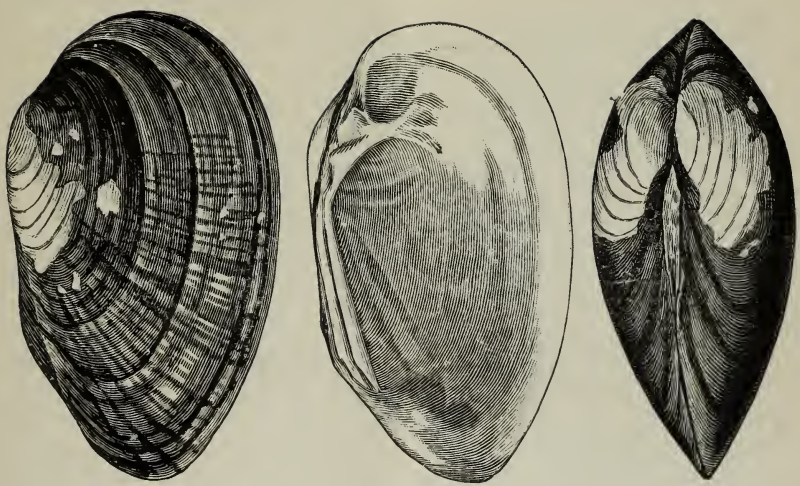
BY S. HART WRIGHT.

Unio Orcuttii (Sp. nov). Shell oblong-ovate, inequilateral, not attenuated posteriorly, abruptly jointed behind, and sometimes slightly biangulated there, in front evenly rounded, basal margin gradually convex, and often nearly straight, dorsal margin nearly straight, or moderately arched. Epidermis variable, olive-brown, or olive-yellow, or reddish-brown, with many faint green rays in fascicles, and three or four zones of growth, of darker color on the dividing lines. Surface smooth and often shining. Umbo obtuse, depressed, and slightly raised above the dorsum. Umbonial ridge much depressed and very obtusely rounded. Posterior slope depressed, scarcely carinated, descending steeply and in nearly a straight line to the joint, which is carried up to the transverse axis. Cicatrices distinct, well impressed, those of the dorsum are over the umbonial cavity. Cardinal teeth short, erect, summits divaricate, granulate, firm.

Lateral teeth slightly curved, arising from the cardinal tooth, acicular at extremity, and groove deep. Nacre a livid-white, copper-colored, or brilliant salmon, or purple, and chocolate colored. Cavity of beaks shallow. Habitat, Manatee River and west coast of Florida (C. T. Simpson), and in Lake Miakka, Florida (Dr. W. Newcomb).

In cabinet of Academy Natural Sciences, Philadelphia, National Museum, and Cornell University. Width 2.35, length 1.5, diameter 1 inch.

Observations. The affinity of this species is with U. Geddingsianus, Lea, but is more oval than the latter. It is with pleasure we dedicate this species to Mr. Charles R. Orcutt, a working conchologist of San Diego, Cal.



UNIO ORCUTTII.—S. HART WRIGHT.

FLORIDA.

SCIENTIFIC MISCELLANY.

(Compiled by Maurice Lopatecki.)

The belief that human beings should sleep with their heads to the north is said to have its foundation in a scientific fact. The French Academy of Science has made experiments upon the body of a guillotined man which go to prove that each human system is in itself an electric battery, one electrode being represented by the head, the other by the feet. The body was taken immediately after death and placed on a pivot, to move as it might. After some vacillation the head portion turned toward the north, the body then remaining stationary. One of the professors turned it half way around, but it soon regained its original position, and the same result was repeatedly obtained until organic movement finally ceased.

The mean height of the land above sea level, according to John Murray, is 2,250 feet, and the mean depth of the ocean is 12,480 feet. Only 2 per cent. of the sea is included inside a depth of 500 fathoms, while 75 per cent. lies between 500 and 3000 fathoms. If the land were filled into the hollows, the sea would roll over the earth's crust to a uniform depth of two miles.

Tigers have lately been reported from two extremes of Siberia —Vladivostock, upon the Japan Sea, and a point to the north of the Caspian Sea. They have long been known in the Chinese forests near Vladivostock, but their appearance in the region of the Caucasus is quite remarkable.

Australia has some giant caterpillars. Mr. A. S. Olliff, of Sidney, mentions one moth larva, abundant during the past season, as being seven inches long, and specimens of larvae of two other species measure eight inches in length.

Occultations of stars and planets are extremely rare, but Dr. Berberich of Berlin, believes observations of them would be very important, throwing light on the extent and density of planetary atmospheres, and in the case of Mars and Venus affording a means for the determination of parallax and diameter.

Mr. E. M. Hasbrouck asserts that ten species of North American birds can be regarded as missing. Of those, two—the great auk and the Labrador duck—are believed to have become extinct, while the following eight, through scarcity or diminutiveness, were 'lost' with the taking of the first specimens, and are now being eagerly sought. The carbonated warbler, blue mountain warbler, small headed warbler, Cuvier's kinglet, Townsend's bunting, Brewster's linnet, Bachman's warbler and the Cincinnati warbler.

The direct conversion of heat into electric work is a problem that continues to tax the ingenuity of the electricians. What seems to be the most promising attempt at solution yet made is a

new thermo-magnetic generator and motor devised by M. Menges, of Hague. Like the recent pyro-magnetic dynamo of Edison, it depends on the fact that the magnetic metals lose their magnetic power when heated. It claims several important advantages, however, the chief being that the necessary alterations of heating and cooling are given automatically, and that the cores of the armature coils are relieved from changes of temperature.

Considerable differences in the standard barometers of the principal European observatories have been found by Mr. E. A. Sundell, of the Scientific Society of Finland.

The shadow of the total solar eclipse of last August was fifty-six times as bright as the light of the full moon, as estimated by the time required to photograph a landscape

The government of Egypt has been pursuaded to make surveys which prove the existence of a depressed region nearly sixty miles long by twenty miles wide, reaching a depth of 250 to 300 feet below high Nile. This depression has for several years been held by Mr. D. Cope Whitehouse to be the site of the wonderful artificial Lake Moeris described by Herodotus—fictitiously, many have believed—with a circumference of 450 miles. The interest at last aroused in Egypt makes it probable that the Nile will soon be admitted to this valley by a canal eleven miles long. The creation or restoration of this great artificial lake will give fertility to a wide area, and will reduce the annual inundations of the Nile, while storing water to replenish the river in dry seasons.

TERMS USED IN TALKING TO DOMESTIC ANIMALS.

EDITORS OF THE WEST AMERICAN SCIENTIST:—In controlling the movements of domestic animals by the voice, besides words of ordinary import, man uses a variety of peculiar terms, calls and inarticulate sounds—not to include whistling—which vary in different localities. In driving yoked cattle and harnessed horses teamsters cry 'get up,' 'click click' (tongue against teeth), 'gee,' 'haw,' 'whoa,' 'whoosh,' 'back,' etc., in English speaking countries; 'arre,' 'arri,' 'jüh,' 'gio,' etc., in European countries.

In the United States 'gee' directs the animals away from the driver, hence to the right, but, according to Webster's Dictionary, in England the same term has the opposite effect because the driver walks on the right hand side of his team. In Virginia mule drivers gee the animals with the cry 'hep-yee-ee-a;' in Norfolk, England, 'whoosh-wo;' in France, 'hue' and 'huhaut;' in Germany 'hott' and 'hotte;' in some parts of Russia 'haitä,' serve the same purpose. To direct animals to the left another series of terms is used.

In calling cattle in the field the following cries are used in the localities given: 'boss, boss' (Conn.); 'sake, sake' (Conn.); 'coo,

coo' (Va.); 'sook, sook,' also 'sookey' (Md.); 'sookow' (Ala.); 'tloñ, tloñ' (Russia); and for calling horses, 'kope, kope' (Md. and Ala.); for calling sheep, 'konanny' (Md.); for calling hogs, 'chee-oo-oo' (Va.).

The undersigned is desirous of collecting words and expressions (oaths excepted) used in addressing domesticated animals in all parts of the United States and in foreign lands.

In particular he seeks information as to:

1. The terms used to start, hasten, haw, gee, back and stop horses, oxen, camels and other animals in harness.

2. Terms used for calling in the field: cattle, horses, mules, asses, camels, sheep, goats, swine, poultry, and other animals.

3. Exclamations used in driving from the person, domestic animals.

4. Any expressions and inarticulate sounds used in addressing domestic animals for any purpose whatever (dogs and cats).

5. References to information in works of travel and general literature will be very welcome.

Persons willing to collect and forward the above mentioned data will confer great obligations on the writer; he is already indebted to many correspondents for kind replies to his appeal for the *Counting-out Rhymes of Chilaren*, the results of which have been published in a volume with that title. (Elliot Stock, London.)

To indicate the value of vowels in English please use the vowels-signs of Webster's Unabridged, and in cases of difficulty spell phonetically.

All correspondence will be gratefully received, and materials used will be credited to the contributors.

Yours truly,

H. Carrington Bolton.

New York City. University Club.

EDITORIAL.

We present a preliminary statement in this issue of The West American Museum of Nature and Art. which will probably be an incorporared institution by the time this reaches our readers. The importance to be attached to the proposed establishment can hardly be over-estimated, and we hope to receive the assistance and co-operation of every scientist on the coast. The proposal has thus far met with most unqualified approval from leading men which is quite gratifying to us and we look forward to the complete success of the undertaking, vast as its scope surely is.

We have to acknowledge the compliment paid us in this number by Dr. S. Hart Wright, the well-known botanist and conchologist, who dedicates a new Unio from Florida to the editor—a courtesy which we appreciate.

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THE

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MAY, 1888.

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THE WEST AMERICAN SCIENTIST.

VOL. 4. MAY, 1888. No. 37

THE WILLOWS OF BRITISH COLUMBIA AND ALASKA.

The Salicacae or Willows are very abundant in the north-west of this continent, and are to be met with as well on the mainland, as on the islands, in the swampy localities and on very great elevations of the Rocky Mountains and their branches.

The willow which grows in very high localities, in fact the highest growing willow on this continent, is Salix arctica, var. petraca, Anders. It is found in the high parts of the Rocky and Selkirk Mountains at an elevation of 8,000 feet. In the swamps and valleys of the same mountains between Lat. 49°—56° is found Salix Barrattiana, Hook.

Salix Balsamifera, Barratt., sometimes called Balsam-willow, is found in thickets on the Nechacco River, British Columbia.

The Hoary Willow (Salix candida, Willd.), abundant in the northern part of British Columbia, and in the Cypress Hills and near Pincher Creek, N. W. Territory.

The Heart-leaved Willow (Salix cordata, Muhl.), is very common in the Rocky Mountains to the Fraser River, also in thickets near Victoria, Vancouver Island.

The Prairie Willow (Salix desertorum, Rich.), found through the Rocky Mountains to the Columbia Valley, and at Clinton, B. C.

Salix drummondiana, Barratt., clings to the summit of the Selkirk Mountains and also to the valleys of the Rocky Mountains between Lat. 52°—56°.

Salix flavescens, Nutt., on the banks of the Columbia, at Donald.

Salix flavescens, var., Scouleriana, Bebb, common on the coast of the province, and in the Fraser, Columbia, Nicola and Cache Creek Valleys, also at Kodiak, Alaska.

Salix glauca, var., villosa, Anders., in the Rocky Mountains between Lat. 52°—56°, on the summit of the Selkirks and in the northwestern localities of the province of B. C.

The Herb-like Willow (Salix herbacea, Linn.), on the summits of all the higher Rocky Mountains, from Canmore to the Selkirk Range.

Salix lasiandra, Benth. var., typica, Bebb, in thickets at Cache Creek. Var., lancifolia, Bebb., along the banks of the

Columbia, in the Selkirk Mountains, and in the valley of the Thompson at Spence's Bridge in B. C. Also in the valley of Fraser River and in the Island of Vancouver.

Salix longifolia var., argyrophylla, Anders., at Clinton, B. C. and near Swift Current Creek, N. W. T.

The Myrtle Willow (Salix myrtilloides, Linn.), is found on the seacoast of B. C., also in the valley of the Fraser and in Kotzebue Sound, Alaska.

Salix nigra, Hook., very probably in the northern localities of the province, also in the valley of Maple Creek, N. W. T.

Salix prolixa, Anders., found in the valley of Thompson River and around Victoria, B. C.

Salix rostrata, Rich, commonly called Livia Willow abounds from the Rocky Mountains to the Coast Range.

Salix reticulata, Linn, var. nivalis, in the Rocky and Selkirk Mountains, Salix reticulata being found in Alaska on the Islands and on the Coast.

Salix Sitchensis, Sanson, abundant near Victoria, in the Fraser River Valley and in many places in Alaska, as Bartlett Bay, Sitka, source of the Youcon River, and Nushagan. Var. angustifolia, is common in northern British Columbia.

Salix sessilifolia, Nuttall, in the valley of the Fraser.

Salix speciosa, Hook. and Arn., on the highest summits of the Rocky Mountains, in Kotzebue Sound and in Nushagan, Alaska.

Salix vestita, Pursh, found in profusion in all elevated localities in the Rocky and Selkirk Mountains.

Of other willows which are found here and there in the Rocky Mountains, we may mention the following:—

Salix cordata, Muhl., var. Mackenzieana, Hook., in the Rocky Mountains at Kicking Horse Lake.

Salix humilis, Marshall, or the Prairie Willow, in dry localities of the South Kootanie Pass.

The Long-leaved Willow (Salix longifolia, Muhl.), in the Rocky Mountains between the sources of the Fraser and Athabasca rivers.

The Shining Willow (Salix lucida Willd.), found in the same localities as the previous one.

The three varieties of Salix Novaeangliae, Anders. that is (1) var. pseudomyrsinites, Anders. (2), var. pseudo-cordata, Anders., and (3) var. myrtillifolia, Anders. are found in different places of the Rocky Mountains.

Salix phlebophylla, Anders., on summit of North Kootanie Pass. The same willow is found in Ounalaska, on the Island of St. Lawrence and in Kotzebue Sound, Alaska.

The willows which are to be found only in Alaska and partly in N. W. Territories, are as follows:—

Salix arctica, R. Br. in Kotzebue Sound and Ounalaska.

Salix Barcleyi, Anders., in Ounalaska, Kodiak and Bartlett Bay.

Salix chamissonis, Anders., on the Island of St. Lawrence.

Salix fulcrata, var. subglauca, Anders., in Nushagan, Alaska, and probably in N. W. T.

Salix glauca, Linn., in the same places as previous one.

Salix Hookeriana, Barratt., rare species, probably only beween Alaska and N. W. T.

Salix ovalifolia, Trant, near Behring Strait and in other localities of Western Arctic America.

Salix Pallasii, Anders., var. crassijulis in Nushagan, Ounalaska and Bartlett Bay. Var diplodyctya. Anders., on the island of St. Lawrence.

Salix polaris, Wahl., in Wainwright Inlet, Alaska.

Salix phyllicoides, Anders, in Avatsha Bay.

M. Lopatecki.

A SPIDER'S HUNT.

One evening, while reading, I saw a vicious-looking spider cross the table where I sat, and would have killed it at once, but for the delicate sensibilities of a friend, who prevailed upon me to spare its life. It was shortly out of sight, but a few minutes after again appeared on the table-cover, and having reached a spot near to one side, stopped, and remained perfectly motionless.

I was curious as to its intentions, and so, apparently, was a fly, which walked over to his spidership to make an examination, preliminary, perhaps, to holding a post-mortem. During the close examination by the fly the spider showed no signs of life, until, becoming less apprehensive it got in front of his wicked-looking mandibles, when he made a frantic jump for it, but the inquisitive fly was too quick for him and flew off to contemplate its foe from a safer distance. By this time I knew the spider was on a hunting expedition and was endeavoring by a cunning stratagem to get a dinner. Finding his first artifice unsuccessful, the clever insect changed his tactics and began to chase full tilt after the flies, hoping to capture the more unwary ones. He ran with great speed to pounce upon a fly which was eating a crumb, but was again disappointed by the fly taking flight. Whether this predaceous spider finally succeeded in accomplishing his purpose I cannot say, for he soon raced across the table and down the other side and was seen no more.

ALAMEDA, CALIF. *H. R. Taylor.*

PUBLICATIONS RECEIVED.

Fifth Annual Report of the State Agricultural Experiment Station, Amherst, Mass., 1887.

Annual Report of the Canadian Institute, session 1886-87.

The following papers, by Geo. F. Kunz, have been received from their author: Precious stones (from Appleton's Physical Geography); Precious stones (abstracts from Mineral Resources

of the United States, 1885-86`; Waldon Ridge, Tennessee, meteorite; Taney County, Missouri, meteorite; Hollow Quartz from Arizona; Chattanooga County, Georgia, meteorite; East Tennessee (?) meteorite; A North Carolina Diamond; Hydrophane from Colorado and silver nugget from Mexico; Powder Mill Creek meteorite; Rhodocrosite from Colorado; on the new artificial rubies; two new meteorites from Carroll County, Kentucky, and Catorze, Mexico; Gold ornaments from United States of Columbia; Gold and silver ornaments from mounds of Florida; on a large garnet.

Bulletin on the building stones of California. From the University of California, Berkeley, 1888.

Report of the condition of winter grain, the condition of farm animals, and on freight rates of transportation companies. April, 1888. U. S. Dept. Agric.

The following papers, by Dr. R. W. Shufeldt, have been received from their author: Osteology of Amia Calva; On an old portrait of Audubon, painted by himself, and a word about some of his early drawings; A review of the muscles used in the classification of birds; On a collection of birds' sterna and skulls, collected by Dr. T. H. Streets; Notes on a few of the diseases and injuries of birds; Notes on visceral anatomy of certain Auks; Description of Hesperomys truei; On injury of the beak in birds, and the method of repair; The Veterinary Service of the U. S. Army; Arrow-release among the Navajos; Observations upon the habits of micropus melanoleucus, with critical notes on its plumage and external characters; The number of bones at present known in the pectoral and pelvic limbs of birds; Anatomy of Geococcyx Californianus; Additional notes upon the Anatomy of the Trochili, Caprimulgi and Cypselidae; Observations on the Pterylosis of certain Picidae; Contributions to science and bibliographical résumé of the writings of R. W. Shufeldt, 1881–1887.

CENTENNIAL OF CINCINNATI AND THE CENTRAL STATES.

Antiquarians, historians and all students of Natural History will be especially interested in the great Centennial Exposition to be held at Cincinnati, Ohio, from July 4th to October 27th. Over 5,000,000 objects wil be displayed, covering about 600,000 square feet of space. Excursion rates on all the railroads. This event will be ever remembered in the history of the great northwest.

Collectors and correspondents of Warren K. Moorehead will be pleased to learn that his entire collection will be on exhibition in the 'Pioneer and Historical Building,' covering 500 square feet. Mr. Moorehead will attend it in person and will be pleased to meet and make the acquaintance of all interested in Archæology.

THE MOST NORTHERN STATION OF AGAVE SHAWII.

On a recent tramp in search of fossils, I found myself wandering along the ocean bluff on the west side of Point Loma, and, when about midway between the hotel at Ocean Beach and the light-house on the Point, I noticed a little way ahead what I correctly surmised to be the flower stalks of the beautiful Agave Shawii, originally described from the plants found in the vicinity of the United States and Mexican boundary monument, a few miles south of San Diego. Only a half dozen stalks were found erect and the several hundred plants were confined to a strip along the bluff, some sixty feet above the water, not exceeding 300 feet in length.

Probably this species will not be found further north, unless, possibly, it may occur near the Soledad pines, where I failed to observe it, however. It is now known to be abundant near the coast southward as far as San Quintin bay, Lower California, and has been reported equally abundant considerably further south.

C. R. Orcutt.

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495	Cowbird	1	03
498	Red-winged Blackbird	4	02
508	Bullock's Oriole	4 5	08
510	Brewer's Blackbird	4 5	04
519a	Crimson House Finch	4 5	04
581	Song Sparrow	4 5 6	02
591b	California Towhee	4	05
593	Cardinal Grosbeak	3	04
622a	White-rumped Shrike	4 5	04
703	Mockingbird	4	04
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721a	Parkman's Wren	5 7 8	04

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..cornea.
.10..costata, Mull.
..cretica, Fer.
.10..crystallinus, Mull.
..cumberlandiana, Lea.
..cunninghami, Gray.
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..dentifera, Say.
.15..denudata, Rossm.
..depressula, Parr.
..desertella, Zick.
.15..desertorum, Fors.
.10..devia, Gld.
..edwardsi, Bland.
..ehrenbergi.
..var. chilenbia, Bourg.
.05..electrina, Gld.
.15..elevata, Say.
.05..ericetorum, Mull.
.20..euphorca, Bourg. var.
..eustilbus, Bourg.
.25..exarata, Pfr.
.05..exoleta, Binn.
. explanata, Mull.
.50..facta, Newc.
. falconeri, Rve.
.05 .fallax. Say.
..faustina, Ziegl.
.20..fidelis. Gray.
.20..fleurati, Bourg.
..friabilis, W. G. Binn.
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..guamensis, Gay.
.10..gularis, Say.
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. hopetonensis, Shuttl.
.05..hortensis, Mull.
.10..var. ——
.15..hoyti, Garret.
.20..hieroglyphicula, Michaud.
.10..hirsuta, Say.
.05..hispida, L.
.05..inflecta, Say.
1.00..infumata, Gld.
..imperator, Mont.
.10..inornata, Say..
.05..interna, Say.
.10..intersecta.
.10..jejuna, Say.
..josephinae, Fer.
.15..kellettii, Fbs.
.05..labyrinthica, Say.
..laevigata, Pfr.
.25 laevis, Pfr. (sub-fossil).
.25..lais.
.50..var. ——
.25..lanta, Lowe.
.25..var. ——
.05..lapicida, L.
..launcestonensis, Rve.
..lefeburiana, Fer.
.25..levis, Pfr.
.10..ligera, Say.
.10..lineata, Say.
.10..lineata, — —
..locheana, Bourg.
..lombei, Pfr.
.10..loricata, Gld.
..macgregori, Cox.
..mandarina, Fer.
.15..marginata, Mull.
.05 .maritina, Drap.
.10 .melanostoma, Drap.
..metaformis.
.10..millerii, Pfr.
.05..minuscula, Say.
.35..mirabilis, Fer.
.10..mitchelliana, Lea.
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.05..var, leaii.
.10..mozambicensis, Pfr.
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.10..muscarum, Lea.
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..nucula, Parr.
..obstricta, Say.
.05..obvoluta, Mull.
.10..palliata, Say.
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pellita, Fer.
.10..pennsylvanica, Green.
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..personata, Lam.
.05..perspectiva, Say.
..philammia. Bourg.
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.15..planospira, Rossm.
..plebeia.
.10..polygyra, Say.
.20..pomatia, L
..poupilieri, Bourg.
..proboscidea, Pfr.
.15..profunda, Say.
.20..provisoria, Pfr.
..psammita, Bourg.
.20..psara, Bourg.
..puella.
.05..pulchella, Mull.
.10..pustula, Fer.
.10..cereolus, Muhlf.
..rufocincta, Parr.
.20..pyramidata, Drap.
.20..var. ——
.25. ramentosa, Gld.
.25..rariguttata, Moussam.
..roemeri.
.05..rotunlata, Mull.
.05..rufescens, Pennant.
..rufoapicata, Parr
.10..rugeli, Shuttl.
.05..rupestris, Drap.
.15..sabulosa, Hazay.
..sayii, Binn.
.10. septemvolva, Say
..sequoicola,
.10..serpentina, Fer.
..soconensis, Pfr.
.10..solitaria. Say.
.25..spinosa, Lea.
.05..splendida, Drap.
..sportella.
.15..stearnsiana, Gabb.
.50..var. ——?
.05..stenotrema, Fer.
.05..strigella, Drap.
.05..striatella, Anthony.
..squlus, Hds.
.10..syriaca, Ehrenb.
.20..traskii, Newc.
..var. depressa.
.10..terrestris, Chem.
..terverii.
.15 .texasiana, Mor.
..thayxix, Bourg.
.05..thyroides, Say.
.25..townsendiana, Lea.
.10..tridentata, Say.
.trigona, Z egl.
.10..trochiformis, Fer.
.25..troilus, Gld.
.15..troostiana Lea.
.15..troschelli, Pfr.
.25..tudiculata, Binn.
..tucanensis, Pfr.
..umbrosa, Part.
.15..uvulifera, Shuttl.
.20..var. ——?
.20..vancouverensis, Lea.
.05..variabilis, Trist.
.15..varians, Mke.
.20..var. ——
.20. var. ——
.15..vermiculata, Drap.
.25..verticillus, Fer.
.10..virgata, DaCosta.
..viridula, Mke.
.25..vittatta, Mull.
.05. volvois, Parr.
.25..zonaria, L.
..————?

Stenogyra.

.10..gutierrezi, Arango.
.10..junceus, Gld.
.10..octona, Chem.
.10..octonoides, Ad.

Succinea.

.05..campestris, Say.
.10..elegans, Risso.
.15..haydeni, W. G. B.
.20..higginsii.
.10..luteola, Gld.
.05..obliqua, Say.
.10..ochracea, Botta.
.10..oregonensis, Lea.
.15..pleuraulaca, Let.
.05..putris, L.

Vitrina.

.25..latissima.
.05..limpida, Say.
.10..pellucida, Mull.
.50..thomsoni, Brazier.

Megalomastoma.

..apertum, Payr.
..mani, Payr.

Trochatella.

.25..regina, Mer.
.25..var ——
.25. var.——
.25..subunguiculata, Payr.

Helicina.

.25..acuminata, Velr.
.25..blandiana, Gundl.
..columellaris, Gundl.
.25..lucida,
.25..mestrei, Arango.
.15..musiva, Gld.
..nuda, Arango.
.05..occulta, Tryon.
..orbiculata, Say.
..pugulata, Poey.
..remota, Poey.
.10..sagraiana, Orb.
..tectiformis, Mons.
.10..uberta, Gld.

Achatina.

.05. acicula, Mull.
..fasciata, Mull.

Achatinella.

.15..abbreviata, Rve.

.05..citrina. Migh.
.05..lo.a'a, Fer.
..nubulosa, Migh.
.15..rufa. Newc.
.25..spirizona, Fer.
.10..swiftii, Newc.
.10. tessellata, Newc.
.05..tristis, Fer.
.05..turritella, Fer.
.05..viridans, Migh.

Cylindrella.

.20..angustior, Wr.
.20..atropurpurea, Arango
.10..elegans, Pfr.
.15..fastigiata, Gundl.
.50..hidalgoi, Arango, (types).
.50..var.——
.25..incerta, Arango.
.25..integra, Pfr.
.25..lateralis, Par.
.25..shuttleworthiana, Say
.25..vignalensis, Wr.

Agriolimax.

.15..laevis, Mull.

Prophysaon.

..hemphilli, Binn. & Bland.

Hemphillia.

..glandulosa, Binn. & Bland.

Ariolimax.

..columbianus, Gld.

Cyclostoma.

.05..dentatum, Say.
.20..dysoni, Pfr.
.05..elegans, Mull.
..inca, D'Orb.
.15..mamillaris, Pink.
..occlusus, Morch.
..olivieri.
..punctatum.
.10..santa cruzensis.
.05..su'catum, Drap.

Partula.

..affinis, Pse.
.10..auriculata. Brod.
.15..bilineata, Pse.
..bittata, Pse.
.10..crassilabris, Pse.
..dubia, Garrett.
..elongata, Pse.
.15..faba, Martyn.
.20..var. ——
..formosa, Pse.
.05..gibba, Fer.
..guamensis, Pfr.
..hebe, Pfr.
.20..var, bella.
..huahinensis, Garrett.
.10..hyalina, Brod.
..imperforata, Pse.
..lineolata, Pse.
.10..lirata, Pse.
..mastersii, Pfr.
.20..nucleola, Pse.
.15..otaheitana, Brug.
..planilabrum, Pse.
..radiata, Pse.
.10..rosea, Brod.
.20..var. ——
.10..rustica, Pse.
.10..sinistrorsa, Pse.
..subangulata, Pse.
.10..thalia, Garrett.
.05..varia, Brod.
.10..virginea, Pse.

Bulimus.

.05..acutus, Mull.
.25..albus, Sby.
1.00..arrosus, Brod.
..bivaricosus, Gask.
.25..broderipi, Sby.
1.00..chilensis, Sby
..conspersus, Sby.
.15..corneus, Sby.
.75..coturnix, Sby.
.50..coquimbensis, Brod.
..crenulatus, Pfr.
.10..decollatus, L.
.40..derelictus, Brod.
.05..detritus, Mull.
.00..dufresni, Leach.
..eburneus, Pfr.
.75..elegans, Pfr.
.50..elobatus.
.10..erythrostoma, Sby.
.25..fulguratus, Jay.
..guadaloupensis, Brug.
..hoconensis, Sby.
1.00..klamereri.
..koroensis, Garrett.
..laevis, Mull.
..var.—
.05..lubricus, Mull.
..metaformis, Fer.
..var, banda.
..miltocheilus, Rve.
. mindoroensis, Brod.
.10..montanus, Drap.
.15..mooreanus, Binn.
.30..morosus, Gld.
..obscurus, L.
.15..pachychilus, Pfr.
.50..pallidior. Sby.
.50..piperatus, Sby.
.50..pithogaster, Fer.
.05..pupa, L.
.10..pupaeformis, Brod.
.50..rhodacme. Pfr.
..rosaceus, King.
.75. seemani, Dohor.
..shotellerii, Bourg.
..sufflatus, Gld.
.15..tournefortianus, Fer.
.25..undatus, Fer.
.50..var.——
.25..variegatus, Pfr.
.50..vesicalis, Gld.
..———?

Pupa.

.25..alveatea, var.
.05..armifera, Say.
.05..avenace, Brug.
.10..brondeli, Broug.
.10..californiensis, Rowell.
.10...chordata, Pfr.
.10..———(No. 1323).
.05..contracta, Say.
.10..edentula, Drap.
..fallax.
.05 .frumentum, Conti.
.50..hordeacea. Gabb.
.15..incana, Say, tme.
.20..var.——
.15..iostoma, Pfr.
.05..marginata, Drap.
.05..marginata, Say.
..marmorata, Pfr.
.10..mumia, Brug.
.05..muscorum, L.
.05..ovata, Say.
.05..quadridens, Drap.
.20..rowellii, Newc.
.20..sagraiana, Pfr.
.05..secale, Drap.
..striatella, Fer.
..tenuilabris, Gundl.
.05..umbilicata, Drap.
.05..———?
.05..——?

Truncatella.

.05..californica.
.05. caribbea, Sby.
.05..costulata, Risso.
.10..laurantia, var. Fiji.
.05..laevigata, Risso.
.05..bilabiata. Pfr.
.05..montagui, Lowe.
.10..pulchella. Pfr.
.10..stimpsonii, Stearns.
.05..subcylindrica, Gray.
.10. vitiana, Gld.

Carychium.

.05. exigurem.
.05..minimum, Mull.

Orthalicus.

..undatus, Brug.

Pseudotrochus.

..virgineus, L.

Chondropoma.

.10..dentata, Say.
.20..dilatatum, Gundl.
.20..blaini, Gundl.
.20..egregium, Gundl.
..gundlachi, Arango.
.20..latilabre, Orb.
.15..moestrum, Shuttl.
.15..obesum, Mke.
.20..sagebieni, Payr.
.15..shuttleworthi, Pfr.
.10..sordidum, Gund.
.10..tryoni, Arango.

Clausilia.

.05..alboguttulata, Wagner.
.10..binotata, Ziegl.
.10..biplicata, Ofan.
.50..bidens, Tarton, (types).
.10. caerulea, Fer
.15..crassicosta. Benoit.
.05..exarata, Ziegl.
.05. gibba, Ziegl.
..kutschigri, Kust.
.05..laminata, Montagu.
.05..latilabris, Wagner.
.05..nigricans, Fult.
.10..punica, Bourg.
.10. rugo-a, Drap.
.10..ventricosa, Drap.

Tudora.

..fecundum, C. B. Ad.

Punctum.

..pygmaeum.

Ferussacia.

.10..amauronix, Bourg.
..carnea, Bourg.

Cistula.

..illustris, Say.

Pitys.

1.00..fratercula. Pse.

Binneya.

1.00..notabilis, Cooper.

Ammonitella.

1.00..yatesii, Cp.

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..bulimoides, Jickeli.

Glandina.

.15..truncata, Say.

Liguus.

..fasciatus, Mull.

Cyclotus.

.30..———

Blandiella.

..filicosta, Gundl.

Proserpina.

.10..depressa, Orb.

Pupina.

..meridionalis, Pfr.

Omphalotropis.

.20..ochrostoma, Pse.

Ctenopoma.

..garridianum, Gundl.
..bilabiatum, Orb.

Diadema.

..parva, Pse.
.20..scalariformis, Pse.

Valonia.

.10..minuta.

Meadia.

..dissumulans, Payr.

Cionella.

.05..lubrica, Leach.
.05..subcylindrica L.

Macroceramis.

.20..dalliana, Bland.

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(*Editorial from the Cosmopolitan, December, 1882.*)

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While the Verraux Freres were gaining a world-wide reputation, an American lad, William H. Winkley by name, was pursuing his studies at the famous technical schools of the French capital, and, when his means were all but exhausted, he left his lodgings in the Latin quarter and apprenticed himself under these famous masters. After serving a long and laborious apprenticeship in the study of animal forms, anatomy, and drawing, he considered himself sufficiently equipped for the practical work of his vocation Returning to America, and selecting a small interior town where rents and living expenses were light, he set up anestablishment of his own, as large as his limited means would allow.

To-day, he supplies the largest museums of the world with stuffed specimens from the elephant down to the smallest rodent, besides large quantities of minerals, rocks, fossils, casts of fossils, skins, and skeletons (unmounted) of animals of all classes, and often the wild animals themselves, alcoholic specimens, insects, crustaceans, shells, echmoderms, corals, sponges, and botanical specimens, from every quarter of the globe and in a great variety of form and price. Also anatomical preparations, chemical, philosophical and optical instruments, with Naturalists' supplies of every description, and, the Verraux Freres being now dead, he has established, as they did, stations upon every continent for the collection of natural history specimens. The attaches of all the stations are over 100 in number, many of whom are specialists.

At his American headquarters at Clearfield, Iowa, there are not far from 100,000 specimens of all classes. Besides mounting the skins sent in by his own collectors, this eminently successful taxidermist takes custom work in his department from those desiring the same, and many hundreds of persons and museums throughout the civilized world are constantly sending him mammal and bird skins and skeletons for restoration. Especially is this true of those scientific persons and wealthy individuals, who, while abroad, have shown prowess in the hunt.

But it is not alone in taxidermy that this cosmopolitan naturalist has won an unrivalled reputation. Years ago he devised a plan whereby even those of moderate means could possess a good cabinet. This, the installment plan has from the start been a success, and in hundreds upon hundreds of cases has proven itself an inestimable boon to those of moderate means who desire a good collection. Many of the best collections in this country have been obtained entirely upon this plan and students, professional men, schools and colleges have all expressed themselves perfectly satisfied with its workings in their respective cases.

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VOLUME IV. WHOLE NO. 38.

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JUNE, 1888.

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THE WEST AMERICAN SCIENTIST.

VOL. 4. JUNE, 1888. No. 38

ARTIFICIAL FLOATING ISLANDS.

Artificial floating islands, as far as I know, are only found in some lakes of Mexico, where they are used for agricultural purposes, and in these floating gardens all vegetables grow very luxuriantly. So far the idea is not a new one, but it has never been carried out on a large scale.

Notwithstanding the tropical and sub-tropical climates would be more favorable to the vegetation on such islands, we think the temperate climate would also be suitable to it; hence, we wish to call special attention to this subject.

The islands can be made of large and powerful rafts of several layers, covered with earth, the latter with sloping sides, so that the center of the island forms a terrace; the slopes are covered with large pebbles to prevent the earth from being washed away by the action of the water. The rafts should be constructed in such a way that other ones could be easily attached to them by means of flat and broad bridges, so the several rafts or islands would gradually cover the lake or other sheet of water so far as should be desirable with regard to navigation; every raft being ready and covered with earth can be used at once as an island and prepared as a garden, or planted with trees.

The first raft should be fixed to the bottom of the lake by means of several anchors, every anchor must be brought at some distance from the raft so that the cable may be stretched as far as possible before it sinks down; in this way the raft will be immovable even in the severest storm, for the stretched cables of the anchors hold it on all sides. The latter are, however, unnecessary for the rafts afterwards enclosed by others and only to be used for the outside ones exposed to the force of the waves. But the anchors should not be spared, as it is the only way to secure the firmness of the whole. To prevent any accident by ice they should be fastened *under* the rafts.

Of course the sort of wood used must be most durable, and the earth-layers thick enough for the cultivation of shrubs and trees. There would be also no difficulty in building wooden houses on the rafts, but they should be firmly attached to it; in this way villages might be formed where there is now only water. The height above the level of the water must be the same for all

islands and the flat bridges should reach from the terrace of one island to that of another, so the ways on them would also be all at the same level.

For gulfs and inlets of the ocean the islands are to be yet more securely fastened to the bottom and so the number of the anchors to be used must be increased. It would be also advisable to protect the rafts from the force of the waves by means of small islands placed at some distance so as to form a line of banks or gulf-breakers; these small rafts could be constructed in a triangular shape, with one of the points directed sea-ward; naturally the e rafts should also be fastened very securely by means of anchors.

Of course, if large sheets of water should be covered with islands, broad canals must be left open for navigation.

After many years the rafts will become so far decayed that they cannot bear any longer the weight of the earth-layers; in this case new ones of several layers should be placed *under* the old ones; the foundation will then last for almost any length of time.

We do not doubt but the idea can be carried out on a large scale; the consequences would be of enormous advantage to agriculture and commerce. The many and large North American lakes, gulfs and inlets would be very much suited to the purpose Nature itself in constructing the floating islands in large rivers as for instance in the Mississippi, of wrecks, vegetable matter, etc., shows the way in which extensive sheets of water should be made profitable to men.

We think it to be necessary that the goverment takes the matter in hand in ordering to try it on a small scale. We hope also these lines may not be overlooked by influential authorities, able to carry out themselves what they think useful and important.

MIDDLEBURG, HOLLAND, Feb., 1888. *M. Buysman.*

The model of an earthquake is a unique piece of apparatus that has been constructed by a Tokio seismologist, patiently and laboriously following out the accurate records of a modern seismograph. Prof. Sekiya has succeeded in shaping a long coil of copper wire so as to represent, with the utmost precision, the intricate path described by a shaken spot of the earth's surface. The model magnifies fifty times the ground's absolute motion during seventy-two seconds, and resembles a ball of twine unwound and thrown down in a confused heap. Numbered tags show the progress of the shock for each second of time.

A Belgian entomologist has produced the numerous color varieties of ceriain coleoptera by chemical means, though he does not claim that his process is that of nature. Alkalies and acids give colors varying from brown through red to yellow, and calcic chloride and heat yield all the tints from green to violet.

ALBINO TOWHEE.

While collecting at Laguna Beach, Los Angeles Co., on Aug. 25th, 1887, I was fortunate enough to take an Albinistic Pipilo fuscus crissalus. When shot it seemed to be in a stupid mood, with its feathers ruffled up. Following is a description of it:

Breast white, gradually shading into ashy gray on sides and neck, and chestnut on flanks and crissum.

Throat patch brownish yellow, *streaked* and *bordered with white.*

Back and tail coverts pale brown.

Feathers of crown and nape *white*, each edged and tipped with brown.

Tail brown, crossed near end by a dirty white bar, an inch wide.

Quills and webs of primaries *white*, the latter edged and tipped with brown.

Feet and bill flesh-colored.

Iris light yellow.

Lgth., 8.25; Wg., 3.25; Tl., 3.87 Female.

Considerably smaller than the average adult.

RIVERSIDE, CALIF. *Theo. D. Hurd.*

A GLANCE AT BOOKS.

LOMB PRIZE ESSAYS.—Under this title are comprised four essays, for which an aggregate sum of $1100 in prizes was awarded to the writers by Henry Lomb, of Rochester, N. Y., through the American Public Health Association. The subjects treated are, Building a Home, Healthy Food, School Hygiene, Disinfection, and the Preventable Causes of Disease, Injury and Death. These are valuable papers and worthy of perusal by all and can be procured for 15 cts. each from Dr. Irving A. Watson, secretary American Public Health Association, Concord, N. H.

HAND BOOK OF PLANT DISSECTION.—By the editors of the *Botanical Gazette*, Henry Holt & Co., New York, publishers. This is the first work of the kind directed solely to the study of the various plant tissues. The subject in all its branches is treated with great precision and simplicity, and yet comprehensiveness. The arrangement is excellent, and the book will be found adapted to the use of schools and colleges, or of students working by themselves—an excellent text-book and a valuable addition to botanical literature.

WORLD ENGLISH.—*The Universal Language.*—Every one has heard of the butcher, who after a long search for his knife, at last found it in his mouth: so speakers of English have been seeking for a universal language, when, lo! it is in their mouths. The intelligibility of English words has been obscured by a dense mist of letters. This is now dispersed by A. Melville Bell, who has already won a world-wide reputation through his invention

of 'Visible Speech,' the great boon to deaf-mutes. Professor Bell calls this new discovery of his 'World-English,' and the result is a language which cannot fail to meet with acceptance, and at once supersede the supposed necessity for Volapük, or any other artificial language. No language could be invented for international use that would surpass English in grammatical simplicity, and in general fitness to become the tongue of the world. It is already the mother-tongue of increasing millions in both hemispheres, and some knowledge of the language is demanded by all educated populations on the globe. Social and commercial necessities require that the acquisition of this knowledge shall be facilitated, and it is believed that Professor Bell's invention has removed the last impediment to English becoming the universal language, for which vague desires have long been entertained, although hitherto only futile efforts have been made. 'World-English' is published in pamphlet form by N. D. C. Hodges, 47 Lafayette Place, New York. Price, 25 cents.

Our Native Ferns and their Allies —By L. M. Underwood, Ph. D. The third edition of this valuable book has just appeared from the press of Henry Holt & Co., New York. Of the true ferns it records 156 species, and gives synoptical descriptions of the other American Pteridophyta known north of Mexico. The fern allies have 68 species noticed, among them a new genus (Salvinia) and five species—two hitherto undescribed—that were not embraced in the former editions.

Nature Studies.—J. Fitzgerald, publisher, 24 East 4th street, New York. Price. 15 cents. Here are contained four highly interesting essays on 'Flame,' 'Birds of Passage,' 'Snow' and 'Caves,' by Prof. Lowe, Dr. Robert Brown, G C Chisholm, and James Dallas, respectively. An attractive variety of subjects, and the essays are written in captivating style.

Nests and Eggs of North American Birds.—The third edition of this standard work of Prof. Oliver Davie is now in press. It will contain twelve full-page engravings by Dr. Theo. Jasper and W. O. Emerson, with an introduction by J. Parker Norris. From the advance sheets received we judge the character of the book to be greatly improved and brought up to date in matters of nomenclature and completeness. Price, $1.00. About 350 pp.. octavo. Orders will be received at this office.

NOTES AND NEWS.

A large eagle was shot last month in Chase County in Kansas.

Four barrels of water of the Great Salt Lake will leave after evaporation nearly a barrel of salt.

A beautifully carved reindeer's horn was recently found in a cave in France. This is the latest relic of pre-historic man.

The old Audubon place at 155th street, near 12th avenue, for

many years the home of a naturalist and the house in which he died, is to be sold at auction soon.—*Forest and Stream.*

The largest turtle known to have been captured in Kansas weighed 59 pounds. It was taken in the Neosho river in 1885.

A party of scientists are boring in the soil at the delta of the Nile in search of rock. A depth of 308 feet has been reached, but no rock was found. The overlying soil to a depth of 100 feet was sand.

A large deposit of terra cotta clay has been found near Bethel, Kansas. The bed is about three feet thick, and is said to possess excellent qualities.

A subscriber informs us that Amsinckia goes by the name of crowfoot in the country, and that Krynitzkia is known as wild sweetalyssum. The true sweet alyssum, Alyssum maritimum, has become partially naturalized around San Diego.

An Italian Microscopical Society has just been formed, whose articles and papers are to be published in Italian, French, English, and German. The address of the secretary is J. Platania, 14 Via S. Giuseppi, Acireale, Sicily.

Hawaiian Butterflies—At the last meeting of the Entomological Society of London, Mr. E. Meyrick communicated a paper 'On the Pyralidina of the Hawaiian Islands.' Mr. Meyrick pointed out that the exceptional position of these islands renders an accurate knowledge of their fauna a subject of great interest. He stated that of the fifty-six known species of Hawaiian Pyralidina nine had probably been introduced through the agency of man in recent times; but he believed the remaining forty-seven to be wholly endemic

Mr. W. Saville Kent, formerly naturalist at the Brighton and Great Yarmouth Aquaria, is now Inspector of Fisheries in Tasmania. Mr. Kent is a distinguished scientist, and is well known from his great work on 'Infusoria.' We may expect important and valuable work from his new field of labor.

The Summer Meeting of the Chautauqua Assembly at Pacific Grove, July 5th to 15th inclusive, promises to be an interesting one. Particular attention will be given to natural history, the facilities for study being good The department of General Botany is in the care of Miss M. E. B. Norton, for ten years teacher of this branch at the State Normal School, San Jose: Marine Botany will be taught by Dr. C. L. Anderson, of Santa Cruz, a distinguished Algologist; while Prof Josiah Keep, of Mills College, will have charge of the class in Conchology.

EDITORIAL.

Librarians east and west are asking: 'Are you never going to publish an index and title page for The West American

SCIENTIST?' 'The end of Vol. IV would be a good time; then people could bind their volumes,' suggests the last postal on the subject. Yes, we hope to find time to prepare a complete index and a title page will accompany it, but, while we agree that it should appear with the end of this volume, we fear that it will be delayed until Vol. V appears.

M. Buysman, of Holland, contributes this month an article on artificial floating islands. The ideas presented are not of practical value to San Diego, but they suggest a possibly feasible way of providing Los Angeles with an artificial harbor near home and of which they would do well to take notice.

We have received of Edgar Cherry, of Santa Rosa, Calif., a few choice specimens of petrified wood, found in the foothills near that place.

Where is Mount Diablo, of San Diego county, located?

Do you know of any place near you where fossil bones or shells are found?

COLORS FOR NATURALISTS

A Nomenclature of Colors for Naturalists, and Compendium of Useful Knowledge for Ornithologists.

By ROBERT RIDGWAY,

Curator, Department of Birds, United States National Museum.

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Helix.

$ ..absolena, Bourg.
.15..acenpsia, Bourg.
..acies, Part.
.05..acuta, L.
..adolphi, Pfr.
.15..alabastrites, Mull.
.10..albolabris, Say.
.15..algirus, L.
.05..alternata, Say
.25..amanda, Morel.
.15..aperta, Born.
.10..apicina, Lam.
.10. appressa, Say.
.25..arangiana, Say.
.05..arborea, Say.
.15. arbustorum, L.
..argia, Bourg.
.25..arcolata, Fbs.
..arradica, Parr.
.20..arrosa, Gld.
.15..aspersa, Mull.
.20..asteriscus, Morse.
..atlasiae, Mousson.
.25..aureolenta, Beech.
..auricoma, Parr.
.10..austriana, Ofan.
.10 .var. expallesseus.
1.00..ayresiana, Newc.
.10..barbarea, L.
..var. ——
.15..bermudensis, Pfr.
.75..bipartita, Fer.
1.00..bridgesii, Newc.
.25..bucculenta, Gld.
.15 .californiensis, Lea.
..calendyma, Bourg.
..var. B.
.10..canlicans, Ziegl.
.10..cardidissima, Drap.
.05..cantiana, Montague.
.05..caperata, Montague.
.10..cariosula, Bourg.
1.00..carpenteri, Newc.
.10..carpenteriana, Bland.
.05..carthusiana, Mull.
.05..cellaria, Mull.
..certiculus, Gund.
.05..cespitum, Drap.
.10..clausa, Say.
..claustralis, Ziegl.
..cicatricosa, Mull.
2.00..circumcarinata, Stearns.
.05..ciliata, Ofan.
.35..citrina, L.
.50..var. ——
.50..var. ——
.20..cobresiana, Fer.
.15..columbiana, Lea.
.05..concava, Say.
.05..concinna, Jeffreys.
.15 conoidea, Drap.
.20..conspecta, Bland.
..constantinae, Bourg.
..cooperi.
..cornea.
.10..costata, Mull.
..cretica, Fer.
.10..crystallinus, Mull.
..cumberlandiana, Lea.
..cunninghami, Gray.
.25..dupetithouarsi, Desh.
..dentifera, Say.
.15..denudata, Rossm.
..depressula, Parr.
..desertella, Zick.
.15..desertorum, Fors.
.10..devia, Gld.
..edvardsi, Bland.
..ehrenbergi.
..var. chilenbia, Bourg.
.05..electrina, Gld.
.15..elevata, Say.
.05..ericetorum, Mull.
.20..euphorca, Bourg. var.
..eustilbus, Bourg.
.25..exarata, Pfr.
.05..exoleta, Binn.
. explanata, Mull.
.50..facta, Newc.
. falconeri, Rve.
.05 fallax, Say.
..faustina, Ziegl.
.20..fidelis, Gray.
.20..fleurati, Bourg.
..friabilis, W. G. Binn.
.10..fulginosa, Griffith.
.05..fulva, Drap.
.20..gaberti, Lesson.
..globularis, Ziegl.
.25..godeffroyana, Garr.
..guamensis, Gay.
.10..gularis, Say.
.25..haemastoma, L.
.25. heripensis, Mab.
. hopetonensis, Shuttl.
.05..hortensis, Mull.
.10..var. —
.15..hoyti, Garret.
.20..hieroglyphicula, Michaud.
.10..hirsuta, Say.
.05..hispida, L.
.05..inflecta, Say.
1.00..infumata, Gld.
..imperator, Mont.
.10..inornata, Say.
.05..interna, Say.
.10..intersecta.
.10..jejuna, Say.
..josephinae, Fer.
.15..kellettii, Fbs.
.05..labyrinthica, Say.
..laevigata, Pfr.
.25 laevis, Pfr. (sub-fossil).
.25..lais.
.50..var. ——
.25..lanta, Lowe.
.25..var. ——
.05..lapicida, L.
..launcestonensis, Rve.
..lefeburiana, Fer.
.25..levis, Pfr.
.10..ligera, Say.
.10..lineata, Say.
.10..lineata, — —
..locheana, Bourg.
..lombei, Pfr.
.10..loricata, Gld.
..macgregori, Cox.
..mandarina, Fer.
.15..marginata, Mull.
.05 .maritina, Drap.
.10 .melanostoma, Drap.
..metaformis.
.10..millerii, Pfr.
.05..minuscula, Say.
.35..mirabilis, Fer.
.10..mitchelliana, Lea.
.05..monodon, Rackett.
.05..var. leaii.
.10..mozambicensis, Pfr.
.05..multidentata, Binn.
.05..multilineata, Say.
.10..muscarum, Lea.
.15..var. ——
.20..nemoralina, Petit.
.10..nemoralis, L.
1.00..nickliniana, Lea.
.20..nigritella, Pfr.
.50..newberryana, Binn.
.05..nitida, Mull.
.10..nitidula, Dyr.
..nivosa, Sby.
.50..novaehibernica, Quay.
..nucula, Parr.
..obstricta, Say.
.05..obvoluta, Mull.
.10..palliata, Say.
..paludora, Pfr.
..parraiana, Orb.
pellita, Fer.
.10..pennsylvanica, Green.
..perphysia, Pfr.
..personata, Lam.
.05..perspectiva, Say.
..philammia. Bourg.
.15..physalis, Pfr.
.20..picta, Barn.
.05..pisana, Mull.
.15..planospira, Rossm.
..plebeia.
.10..polygyra, Say.
.20..pomatia, L
..poupillieri, Bourg.
..proboscidea, Pfr.
.15..profunda, Say.
.20..provisoria, Pfr.
..psammita, Bourg.
.20..psara, Bourg.
..puella.
.05..pulchella, Mull.
.10..pustula, Fer.
.10..cereolus, Muhlf.
..rufocincta, Parr.
.20..pyramidata, Drap.
.20..var. ——
.25. ramentosa, Gld.
.25..rariguttata, Moussam.
..roemeri.
.05..rotundata, Mull.
.05..rufescens, Pennant.
..rufoapicata, Parr
.10..rugeli, Shuttl.
.05..rupestris, Drap.
.15..sabulosa, Hazay.
..sayii, Binn.
.10. septemvolva, Say
..sequoicola,
.10..serpentina, Fer.
..soconensis, Pfr.
.10..solitaria, Say.
.25..spinosa, Lea.
.05..splendida, Drap.
..sportella.
.15..stearnsiana, Gabb.
.50..var. ——?
.05..stenotrema, Fer.
.05..strigella, Drap.
.05..striatella, Anthony.
..squlus, Hds.
.10..syriaca, Ehrenb.
.20..traskii, Newc.
..var. depressa.
.10..terrestris, Chem.
..terverii.
.15 .texasiana, Mor.
..thayxix, Bourg.
.05..thyroides, Say.
.25..townsendiana, Lea.
.10..tridentata, Say.
.trigona, Z egl.
.10..trochiformis, Fer.
.25..troilus, Gld.
.15..troostiana Lea.
.15..troschelli, Pfr.
.25..tudiculata, Binn.
..tucanensis, Pfr.
..umbrosa, Part.
.15 .uvulifera, Shuttl.
.20..var. ——?
.20..vancouverensis, Lea.
.05..variabilis, Trist.
.15..varians, Mke.
.20..var. ——
.20. var. —— ratchii
.15..vermiculata, Drap.
.25..verticillus, Fer.
.10..virgata, DaCosta.
..viridula, Mke.
.25..vittatta, Mull.
.05. volvois, Parr.
.25..zonaria, L.
..———?

Stenogyra.

.10..gutierreri, Arango.
.10..junceus, Gld.
.10..octona, Chem.
.10..octonoides, Ad.

Succinea.

.05..campestris, Say.
.10..elegans, Risso.
.15..haydeni, W. G. B.
.20..higginsii.
.10..luteola, Uld.
.05..obliqua, Say.
.10..ochracea, Betta.
.10..oregonensis, Lea.
.15..pleuraulaca, Let.
.05..putris, L.

Vitrina.

.25..latissima.
.05..limpida, Say.
.10..pellucida, Mull.
.50..thomsoni, Brazier.

Megalomastoma.

..apertum, Payr.
..mani, Payr.

Trochatella.

.25..regina, Mer.
.25..var ——
.25. var.——
.25..subunguiculata, Payr.

Helicina.

.25..acuminata, Velr.
.25..blandiana, Gundl.
..columellaris, Gundl.
.25..lucida,
.25..mestrei, Arango.
.15..musiva, Gld.
..nuda, Arango.
.05..occulta, Tryon.
..orbiculata, Say.
..pugulata, Poey.
..remota, Poey.
.10..sagraiana, Orb.
..tectiformis, Mons.
.10..uberta, Gld.

Achatina.

.05. acicula, Mull.
..fasciata, Mull.

Achatinella.

.15..abbreviata, Rve.

.05..citrina Migh.
.05..lo ata, Fer.
..nubulosa, Migh.
.15..rufa. Newc.
.25..spirizona, Fer.
.10..swiftii, Newc.
.10. tessellata, Newc.
.05..tristis, Fer.
.05..turri ella, Fer.
.05..viridans, Migh.

Cylindrella.

.20..angustior, Wr.
.20..atropurpurea, Arango
.10..elegans, Pfr.
.15..fastigiata, Gundl.
.50..hidalgoi, Arango, (types).
.50..var.—
.25..incerta, Arango.
.25..integra, Pfr.
.25..lat ralis, Par.
.25..shuttleworthiana, Say
.25..vignalensis, Wr.

Agriolimax.

.15..laevis, Mull.

Prophysaon.

..hemphilli, Binn. & Bland.

Hemphillia.

..glandulosa, Binn. & Bland.

Ariolimax.

..columbianus, Gld.

Cyclostoma.

.05..dentatum, Say.
.20..dysoni, Pfr.
.05..elegans, Mull.
..inca, D'Orb.
.15..mamillaris, Pink.
..occlusus, Morch.
..olivieri.
..punctatum.
.10..santa cruzensis.
.05..su catum, Drap.

Partula.

..affinis, Pse.
.10..auriculata, Brod.
.15..bilineata, Pse.
..bittata, Pse.
.10..crassilabris, Pse.
..dubia, Garrett.
..elongata, Pse.
.15..faba, Martyn.
.20 .var. ——
..formosa, Pse.
.05..gibba, Fer.
..guamensis, Pfr.
..hebe, Pfr.
.20..var, bella.
..huahinensis, Garrett.
.10..hyalina, Brod.
..imperforata, Pse.
..lineolata, Pse.
.10..lirata, Pse.
..mastersii, Pfr.
.20..nucleoli, Pse.
.15..otaheitana, Brug.
..planilabrum, Pse.
..radiata, Pse.
.10..rosea, Brod.
.20..var. ——
.10..rustica, Pse.
.10..sinistrorsa, Pse.
..subangulata, Pse.
.10. thalia, Garrett.
.05..varia, Brod.
.10..virginea, Pse.

Bulimus.

.05..acutus, Mull.
.25..albus, Sby.
1.00..arrosus, Brod.
..bivaricosus, Gask.
.25..broderipi, Sby.
1.00..chemnitzensis Sby
..conspersus, Sby.
.15. corneus, Sby.
.75..coturnix, Sby.
.50..coquimbensis, Brod.
..crenulatus, Pfr.
.10..decollatus, L.
.40..derelictus, Brod.
.05..detritus, Mull.
1.00..dufresni, Leach.
..eburneus, Pfr.
.75..elegans, Pfr.
.50..elobatus.
.10..erythrostoma, Sby.
.25..fulguratus, Jay.
..guadaloupensis, Brug.
..hoconensis, Sby.
1.00..klamereri.
..koroensis, Garrett.
..laevis, Mull.
..var.—
.05..lubricus, Mull.
..metaformis, Fer.
..var. banda.
..miltocheilus, Rve.
..mindoroensis, Brod.
.10..montanus, Drap.
.15..mooreanus, Binn.
.30..morosus, Gld.
..obscurus, L.
.15..pachychilus, Pfr.
.50..pallidior. Sby.
.50..piperatus, Sby.
.50 pithogaster, Fer.
.05..pupa, L.
.10..pupaeformis, Brod.
.50..rhodacme Pfr.
..rosaceus, King.
.75. seemani, Dohor.
..shotellerii, Bourg.
..sufflatus, Gld.
.15..tournefortianus, Fer.
.25..undatus, Fer.
.50..var.—
.25..variegatus, Pfr.
.50..vesicalis, Gld.
..———?

Pupa.

.25..alvearea, var.
.05..armifera, Say.
.05..avenace, Brug.
.10..brondeli, Broug.
.10..californiensis, Rowell.
.10...chordata, Pfr.
.10 .———(No. 1323).
.05..contracta, Say.
.10..edentula, Drap.
..fallax.
.05 .frumentum, Conti.
.50..hordeacea, Gabb.
.15..incana, Say, tme.
.20..var.—
.15..iostoma, Pfr.
.05..marginata, Drap.
.05..marginata, Say.
..marmorata, Pfr.
.10..mumia, Brug.
.05..muscorum, L.
.05..ovata, Say.
.05..quadridens, Drap.
.20..rowelli, Newc.
.20..sagraiana, Pfr.
.05..secale, Drap.
..striatella, Fer.
..tenuilabris, Gundl.
.05..umbilicata, Drap.
.05..———?
.05..———?

Truncatella.

.05..californica.
.05. caribbea, Sby.
.05..costulata, Risso.
.10..laurantia, var. Fiji.
.05..laevigata, Risso.
.05..bilabiata. Pfr.
.05..montagui, Lowe.
.10..pulchella. Pfr.
.10..stimpsonii, Stearns.
.05..subcylindrica, Gray,
.10. vitiana, Gld.

Carychium.

.05. exigurem.
.05..minimum, Mull.

Orthalicus.

..undatus, Brug.

Pseudotrochus.

..virgineus, L.

Chondropoma.

.10..dentata, Say.
.20..dilatatum, Gundl.
.20..blaini, Gundl.
.20..egregium, Gundl.
..gundlachi, Arango.
.20..latilabre, Orb.
.15..moestrum, Shuttl.
.15..obesum, Mke.
.20..sagebieni, Payr.
.15..shuttleworthi, Pfr.
.10..sordidum, Gund.
.10..tryoni, Arango.

Clausilia.

.05 .alboguttulata, Wagner.
.10..binotata, Ziegl.
.10..biplicata, Ofan.
.50..bidens, Tarton, (types).
.10. caerulea, Fer
.15..crassicosta, Benoit.
.05..exarata, Ziegl.
.05. gibba, Ziegl.
..kutschigri, Kust.
.05..laminata, Montagu.
.05..latilabris, Wagner.
.05..nigricans, Fult.
.10..punica, Bourg.
.10. rugosa, Drap.
.10..ventricosa, Drap.

Tudora.

..fecundum, C. B. Ad.

Punctum.

..pygmaeum.

Ferussacia.

.10..amauronix, Bourg.
..carnea, Bourg.

Cistula.

..illustris, Say.

Pitys.

1.00..fratercula, Pse.

Binneya.

1.00..notabilis, Cooper.

Ammonitella.

1.00..yatesii, Cp.

Cleopatra.

..bulimoides, Jickeli.

Glandina.

.15..truncata, Say.

Liguus.

..fasciatus, Mull.

Cyclotus.

.30..———

Blandiella.

..filicosta, Gundl.

Proserpina.

.10..depressa, Orb.

Pupina.

..meridionalis, Pfr.

Omphalcropis.

.20..ochrostoma, Pse.

Ctenopoma.

..garridianum, Gundl.
..bilabiatum, Orb.

Diadema.

..parva, Pse.
.20..scalariformis, Pse.

Valonia.

.10..minuta.

Meadia.

..dissumulans, Payr.

Cionella.

.05..lubrica, Leach.
.05..subcylindrica L.

Macroceramis.

.20..dalianus, Bland.

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58	Laughing Gull	3	10
70	Common Tern	3	04
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122	Brandt's Cormorant	3 4	25
123b	Baird's Cormorant	3	25
199	Louisiana Heron	3 4	08
201	Green Heron	4	05
221	American Coot	5 6 7	05
316	Mourning Dove	2	02
378	Burrowing Owl	5 to 10	15
385	Road Runner	4	15
413	Red Shafted Flicker	5 6	05
444	Kingbird	3 4	03
448	Cassin's Kingbird	3 4 5	20
495	Cowbird	1	03
498	Red-winged Blackbird	4	02
508	Bullock's Oriole	4 5	08
510	Brewer's Blackbird	4 5	04
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581	Song Sparrow	4 5 6	02
591b	California Towhee	4	05
593	Cardinal Grosbeak	3	04
622a	White-rumped Shrike	4 5	04
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704	Catbird	4	02
713	Cactus Wren	4 5	08
721a	Parkman's Wren	5 7 8	04

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